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THE AMERICAN

GAS LIGHT JOURNAL

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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Pacific Coast Gas Association, Second Annual Meeting.

OFFICE OF THE SECRETARY, OAKLAND, CAL., March 5, 1894.

Upon the suggestion of Mr. Jos. B. Crockett, our President, and with the concurrence of the Directory, it has been decided to hold the next meeting of this Association at Sacramento, on Tuesday and Wednesday, the 15th and 16th of May, 1894.

This has been done to afford an opportunity to members to combine the business of our annual conclave with the pleasure of a visit to the Midwinter Fair, as the time appointed by the by-laws would be after the Fair had closed, and many if not all of the members who live at a distance from San Francisco will thereby be saved the necessity of making two trips to the bay.

Our first meeting was a complete success—the second will not be behind it in interest. Already papers are promised upon topics of interest to gas men, among them being "Practical Analysis of Gas," illustrated with complete apparatus, "Proper Books of Record for Gas Companies," and "Prepayment Meters."

Each member's presence is necessary to the preservation of an organization whose ultimate object is the bringing together in unity of thought and action the gas fraternity. Come prepared to ask questions, to give and receive information. The good accomplished by the last meeting has been felt throughout the year in better results of manufacture and distribution. The pertinent question personally asked and answered is productive of more results than volumes of print.

In order that arrangements may be made for your care and comfort while at Sacramento, please advise me on receipt of this if you intend to be present. You will be later advised concerning headquarters, place of meeting, hotel accommodations, etc.

We want at this meeting a perfect circulation of members, and no dead ends. Yours very truly, JOHN A. BRITTON, Secretary.

[OFFICIAL NOTICE.]

April Meeting, Society of Gas Lighting.

OFFICE OF THE SECRETARY, April 7, 1894.

The April meeting of the Society will be held in the Arena, 31st street near Broadway, New York City, on Thursday, April 12, at 3 o'clock, P.M.

F. S. BENSON, Secretary.

[OFFICIAL NOTICE.]

April Meeting, Guild of Gas Managers.

OFFICE OF THE SECRETARY, April 6th, 1894.

The regular meeting of the Guild of Gas Managers will be held at Young's Hotel, Boston, Saturday, the 14th inst., at 12 o'clock.

A. K. QUINN, Secretary.

BRIEFLY TOLD.

ANOTHER OBJECT LESSON FROM PHILADELPHIA.—The Philadelphia gas kaleidoscope has been given another twist, with the result that an entirely new series of pictures is presented to the vision of the beholder. Perhaps it is wrong to say that the pictures are entirely new, but in any event the chronicler may claim that this latest picture is quite different from any that has been hitherto displayed. Ever since the authorities sealed their promise to give Philadelphians dollar gas, much speculation has been indulged in as to whether or not the sequel would be the wiping out in the current year of the "total profit" of $1,344,219.03,

w ich was returned as the sum added to the treasury of the city through the operations of the municipal gas works for the year 1892—of the named sum, $1,033,990.03 is credited to "net profit," and the balance ($310,229) is the sum "saved" through there having been no charge for gas used on public lighting account. It is not to be wondered at that many Philadelphians fear the works will not be self-sustaining on the dollar basis, since the total profit means considerably more than one-third of the gross receipts for 1892, which gross is returned at $3,497,917, which receipts were gained with the gas rate at $1.50 instead of $1 per 1,000. The real and pressing doubt, however, in this regard is not so much in the cut rate as in the fear that the physical condition of the plant is not healthy enough to stand the effect of the cut. The history of all important concessions in gas rates is undeniably that the increase in sendout following such concessions was sufficient, in two years at most, to restore the equilibrium in profit percentage; but it is also undeniable that the working capacity of the plants in which the experiments were tried, was ample to meet the expected and realized drain on their manufacturing resources. And here is where the real rub is felt in the Philadelphia instance. The chapter and verse for this statement is to be found in a report submitted to the Select City Council of Philadelphia by a special committee appointed to investigate the "physical condition" of the gas works; and a more scathing arraignment of the way in which property could be mismanaged it would be hard to for mulate. Not that the report deals in hard words or bristles with grave charges; indeed, quite the contrary; its language and tone are remarkably even and quiet. Nevertheless, the sting is doubly sharp, from its very evenness and hopelessness. We are told that the total active daily capacity of the works is 6,000,000 cubic feet, whereas, it should be not less than three times that capacity—and would be equal to that maximum if it had been properly kept up. However, how could it be otherwise, when the committee finds that "at Point Breeze, where nearly 60 per cent. of the gas produced by the city is manufactured, the general appearance of the plant is that of dilapidation and decay." And so it goes all through, the only feature that savors of redemption being the plant at the 25th Ward works, *not owned* by the city, but operated by a private company, which sells to the city several million cubic feet of gas each 24 hours. Speaking of the city's own plant at this point, the report says: "As far as the city's plant is concerned, it might be compared to a graveyard, for, while the city furnishes holder capacity, ground and other conveniences to the Philadelphia Gas Improvement Company, it possesses nothing itself but the most antique appliances for making its own gas." Is not this a sufficiently bleak picture? Still, the committee is enabled to add another touch of dreariness to the affair, for having figured out at the $1 rate, a deficit of pretty near $900,000 for the year, the doleful admission is made that the only profit that can be calculated on at all is in the sale of the gas for $1 that is purchased at less than 40 cents per 1,000 from the Philadelphia Gas Improvement Company. All this would logically point, as the main avenue of escape, to putting in the hands of private enterprise the task of making all the coal gas now produced on the works; for we have no doubt that any gas man would willingly take unto himself the contract to produce coal gas on the Philadelphia works at a good, round reduction from the 60 cents per 1,000 which the Gas Bureau asserts is the present manufacturing cost thereof. In fact, the committee does suggest, as the second way out of the dilemma, that the business of gas "manufacture" be conducted solely through purchase from private makers; and its third recommendation is that the works be either sold or leased. The first recommendation, however, seems to us to be the one which would best please the citizens of the city—even if it did cost them the largest first outlay—and that is to put the plant in first rate condition for the manufacture of a mixed gas, which resolution the committee finds would entail a expenditure close on to $3,000,000. Take it all in all, the committee's report is a most interesting one, even though it will not yield much comfort to the advocates of municipal control.

NOTES.—The proprietors of the Camden (N. J.) Gas Light Company have ordered a reduction in the net selling rate to $1.25 per 1,000, the concession to take effect in different sections of the city at different times, as follows: Northern section, June 1st; middle section, July 1st; southern section, August 1st.——Mary Sybil Benham, wife of William H. Cox, of the New Haven (Conn) Gas Light Company, died on March 25th.——The proprietors of the Tyrone (Pa.) Gas and Water Company have reduced the net selling rate to $1.50 per 1,000.——The annual report of the Montreal Gas Company shows a decrease in the receipts for 1893 of $41,500, as against the receipts for 1892. This is partly to be accounted for by the change in the method of manufacture, a mixed water and coal gas having been supplied this year for the first time. The residual products account, of course, shows a marked falling off.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONTINUED FROM PAGE 481.]

TENTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

HELD AT COLUMBUS, O., MARCH 21 AND 22, 1894.

FIRST DAY—AFTERNOON SESSION.

Discussion on Mr. J. W. R. Cline's Paper on Welsbach Burners[1] with Artificial Gas.

The President—Gentlemen, as this is a subject of great interest to us all, I hope it will receive thorough discussion. It is before you now for that purpose.

Mr. Greenough—I think what Mr. Cline has said in regard to this burner is most interesting, and I think we have very great reason for congratulation because of the success it has attained. But at the same time we do not want to be altogether carried away with the idea that it is a perfect burner. We have every reason, however, for congratulation on account of the great increase which has been made in the value of the burner since it was first invented. I think you, gentlemen, who were in the gas business seven years ago, will remember the tremendous flourish of trumpets with which this burner was put upon the market at that time, and it was my good fortune to be sent abroad to make some investigations into the validity of the claims which were at that time made for it. I amused myself the other day in re reading the report which I made to our Directors upon my return, and was greatly pleased to find that the objections which I then alleged to it had been almost all of them met. At that time, which was in '87, the best that was claimed for the burner was a yield of 10 candles to the cubic foot. Now, everybody knows, you can get much better results. Mr. Cline says you can get 20 candles, but the best we have got in Cleveland is 18, and 18 candles to the cubic foot of gas is an extraordinary yield. The experiments showed at that time that the candle power decreased with the use of the lamp, and that the cost was greatly increased by renewals. It seems to be almost as brilliant now, after running quite a long time, as when it commenced. Again, at that time, when it was first introduced by Mr. Welsbach into Vienna, they were claiming enormous results for it in government offices and in private use; a claim which I regret to say could not be sustained. The burner was taken charge of by people in Berlin, who endeavored to introduce it amongst their customers in different parts of Germany, but they found that a pressure, to make the burner work right, was necessary, which was impossible for many of the smaller companies to give. That has been done away with. Again, the manager of the Company in London told me then that the mantles were so brittle it was impossible to have them manufactured in any other city than where they were to be used. That difficulty has also been overcome, and we certainly have to day before us a burner which gives twice as much light as can be obtained from gas by any other means, and which is reasonably permanent in its quality. It is not so friable as to be impossible to handle, and it gives a marvelous light in competition with oil or electricity. So far we have advanced. Now the chief criticism that can be made against the light to day is its color. When you are in a store lighted by it, it certainly looks white; but we all know the little green tinge which pervades the windows and atmosphere in the neighborhood of the store where it is used. They say it can be made yellow, but I have not seen it in operation giving that color, and I think that efforts should be made in that direction to make it either—well, I won't say an absolutely pure white light, because I think a little yellow tinge is better than white light. Again, it is a question whether it is possible to avoid the damage which comes to that burner, in smoky Western cities, from the deposit of soot and dirt on them. I don't know whether that can be overcome or not, but I must say this, that one of four large consumers in Cleveland took his burners out the other day on that account. They have been a great success in Cleveland this winter. The electric company, acting under the inspiration of Providence, proceeded to put in meters this fall, and the result was that in many cases the bills were trebled, in some cases were even larger than that, and outside consumers, who have been robbing the electric companies in the past, promptly gave up the use of electricity and returned to the Welsbach burner. We have put in about 2,500 of them in stores this winter, where they previously used electricity; and it would not become me to look a gift horse in the mouth. We have certainly an ally against electricity and brilliant water gas. The only trouble is it is almost too brilliant. It is so brilliant that it has to be tempered. It is so brilliant that I could not use it on my library table because it would put the fam-

1. For paper, see JOURNAL, April 2, p. 481.

ily's eyes out. I don't know whether that light can be tempered and still have an equal value to the cubic foot consumed. No man wants a light staring him in the face that is going to dazzle him. I think the globe which we have at the further end of that line of lamps there is a good adaptation of it, and I had not seen anything like it before. I am strongly in favor of the Welsbach light, but we do not want to sit down and say that the last word has been said on it and leave the manufacturer to think that nothing is left but to sell the burner.

Mr. Nash—I would like to ask Mr. Greenough if his company furnishes the burner?

Mr. Greenough—No, sir.

Mr. McDonald—How long will a lamp last in ordinary use—that is, not until it wears out, but until the servant girl or some one else breaks it?

Mr. Cline—I think about 500 hours—6 months' use. The second burner there (indicating) has been in use a year in a store. Quite a number of them have been in use a year in Springfield without change.

Mr. Penn - I would like to ask about the pressure. Is it necessary to have a uniform pressure?

Mr. Cline—No, sir; they will work on a varying pressure. I think from 10 to 15, 20 and 25 tenths.

Mr. Gwynn—Has Mr. Cline ever made any experiments with them to find out how fast they depreciate per hour?

Mr. Cline—I have no bar photometer, but as Mr. Butterworth tested a burner which I brought over here a month ago, he can give you something on that point.

The President—Mr. Cline brought over a Welsbach burner about a month ago, which we tested by the photometer, and the average candle power, with two tests, was 43.2. We kept the burner in use night and day for 20 days. At the end of that time the wires supporting the mantle had become bent so much by overheating that the top part of the mantle, leaning over against the chimney, threw the mantle out of the jet of flame and it gave a poor light. On attempting to test the candle power, under these conditions, I had to remove the chimney to clean it, and as soon as I removed the chimney the wire broke in two and the mantle was destroyed. I tested another one on the bar photometer and found that it showed 47.8 candle power, burning 2.9 feet of gas per hour. I kept it burning 10 days and nights with only one short interruption, and we found last evening that it had appreciated 1 candle power.

Mr. Gwynn—About 7 years ago I made an experiment with these burners. It was a practical test which was assigned to me to be made by the President of the Company. Mr. Critchfield represented the Welsbach people, and I represented the Northwestern Ohio. This was when the burners first came on the market, or before they were shown to the public at all, and only showed in closed rooms. At that time the mantles depreciated in candle power very rapidly. I remember making a test of one burner, which showed 33.37 candle power; and inside of 200 hours it fell below 8 candles, burning 2.6 cubic feet of coal gas per hour. In reference to the color of the light, at that time two grades of burners were manufactured, one giving a white light and the other a yellow. The color of the yellow light was about the same as you get from a common burner. I do not know what they have done in that matter since, but there is no question that you can get from it the largest amount of light with the least gas consumed of any other burner ever invented. But the average life of the burner at that time was a great drawback to the lamp. They claim this has been overcome. Whether it has or not I do not know, but I think some improvements are yet to be made in the burner. I think that later on, if they keep on improving, it will be a very desirable burner for gas companies to push and introduce to the market.

Mr. Cantine—I would like to ask Mr. Cline, and also Mr. Greenough, who has had a great deal of experience, whether they regard this burner as a practical affair, to put on the market for everybody to use, in private houses and business places, and all that sort of thing. I am not wholly ignorant, perhaps not so much so as I may appear; but the mantles appear to be exceedingly delicate and easily disturbed by a jar, as by the dusting of chandeliers, or anything of that kind that would produce a jar in the room. I wou'd like to know what the experience has been in that respect, and also in regard to the lighting. I think the instructions I had were to light at the top and not at the base, and frequently where I furnished some of these burners people would be careless about it, allowing the chimney to become full of gas before applying the light, when an explosion would destroy the mantle, and we would be called upon to furnish a new one. Our gas is about 21 candles, and we don't want them to use something that reduces the consumption to almost nothing.

Mr. Cline—Have you electric light competition?

Mr. Cantine—No, sir; not much!

Mr. Greenough—Replying to the question asked me, I doubt very much whether there is a large future for this burner in domestic lighting. I think the largest future for it is in stores, saloons, and in places of that kind, where it pays to have somebody to look after it. You can undoubtedly cut your gas bill practically in two if you are willing to take the trouble to keep the mantles in good condition and replace them properly; but the man who puts them in his house, I think, is liable to get tired in time changing mantles, having them broken, and will say that the thing isn't worth while fooling with. In large stores I think there is a future for this business, where a man puts in enough of them to make it an object to have a man look after them and see that they are kept in order.

Mr. Cline—That coincides with my view exactly.

Mr. Gwynn—Does Mr. Cline find that the life of the mantle is longer where the burner is used continuously and not intermittently? Is not the life of the mantle longer where it is continuously used?

Mr. Cline—Yes, sir; because there is the danger of destroying the mantle by the explosion in lighting it.

Mr. Boyle—We have had considerable experience with this light in Salem, and I can say we were very much gratified with the results. We have pretty fierce competition with electricity, and the electric lights have been placed in a great many stores. By the adoption of this lamp about a year ago we recovered a great many of these consumers. Some stores that were burning oil have placed these lamps in their stores and displaced the oil. I have a letter here which may be of some interest upon this subject from the proprietor of a drug store which was burning oil, which I would be glad to have the members hear. It was a surprise to me to learn that this lamp was really cheaper than oil, and if we get a lamp that is cheaper than oil, our competitor in the field, we are still strictly "in it," as the boys say. The letter is as follows: "As requested by you to write you in reference to the cost of lighting our store with carbon oil, and gas burnt through the Welsbach incandescent gas burner, we have to say our room is 15 by 100 feet; we have been lighting it with 10 center draft lamps, and by taking good care of them we have had a good light. The oil at 7 cents per gallon cost us about $23 a year. It took about one hour each day of our clerk's time to care for the lamps. This amount of time was worth more to us than the cost of the oil, which would make the actual cost of burning carbon oil in our store room $45 to $50 per year. We put in Welsbach incandescent gas burners a year ago. During this year the cost of gas, at $1.50 per 1,000, was $35, and we have had about double the amount of light we got out of the oil. We could not be induced to return to the burning of carbon oil. The mantles on our gas burners have been in for one year, and the most of them are still in good condition." Now, I think that speaks very strongly for the Welsbach burners. I have other letters from persons who have displaced electric lights, that are equally strong in favor of the gas burner.

Mr. Gwynn—I would like to ask if the burner Mr. Butterworth tested, that gave about 48 candles, was a new one, or had it burned a while?

The President—It was a new one.

Mr. Gwynn—And you got about 14 candles to the cubic foot?

The President—We got 16.8.

Mr. Gwynn—The claim they make is 20 candles, I understand. They claim 60 candles for a 3-foot burner; yours was about 17 candles.

The President—Yes, sir.

Mr. Gwynn—The original was about 14½.

The President—Gentlemen, Mr. Mason, the Secretary of the Welsbach Company, is present, and, with your permission, I will invite him to speak a few minutes on this question. Mr. Mason, we will be glad to hear from you.

Mr. Mason—I don't know that I can say very much. The points that have been brought up are all points that we often hear about, and are very *glad* to hear about. As far as the candle power of the lamp is concerned, we are very particular, and prefer to underestimate the lamp rather than to overestimate it. All of the fluid we use in manufacturing mantles is put through a series of tests before final use, going through the test of a photometer; and there has never been a batch of fluid used that did not read at least 70 candles, burning about 3 to 3½ feet of water gas of 22 candle power. As far as the life of the mantle is concerned, a great deal depends upon the care which it receives. As far as its being a suitable appliance for domestic purposes, there is no reason why it should not receive as much attention from the mistress of the house as an oil lamp, and if it receives that attention, it will last and give as much satisfaction as anyone would expect. To be sure the field for the lamp in store lighting seems to be about as 100 to 1, as compared

with the lighting of private residences. In other words, I suppose we are selling 100 lights in stores to the 1 we are putting in residences. At the same time they are finding their way into residences and giving satisfactory results; and where they have been using them for reading purposes, we find them to be so satisfactory that when the users were compelled to return to the use of the argand burner, or oil lamp, they claimed that there was a noticeable difference; and they find it objectionable to read with anything but the Welsbach light. Unfortunately during the latter part of the fall we were in such a position that we were compelled to go very slow on lights, owing to the very excessive demands on our production, it being necessary to keep lamps that were out renewed—by that I mean supplied with mantles. A great many people who had these lights experienced two or three days' delay in getting their mantles, and these people brought to our attention these very points. The fact is that that lamp was so satisfactory as a reading lamp that they objected seriously to being without it. As for its not becoming a very popular lamp in house lighting, I do not think the company anticipates trouble in that direction. A great many things are necessary in house lighting. The lamp wants to be elaborate. People are willing to pay a large price for them. We last summer imported globes from Germany, which we found no trouble in selling in Philadelphia at as high as $15 a lamp, and we had so large a demand that we have placed an order for another consignment this summer. We are doing everything we can to beautify the lamp and bring it into a position that will meet all the desires of the consumers. The small, No. 74 shade, made of opal glass, is the one generally used in stores. As far as the color of the light is concerned, I would say that when we first attempted to produce what is known as our improved light, we followed out the formula of the foreign companies, which is a very severe and intense white light, and no doubt to many people it has a green cast. Since that, however, we have recognized the fact that that is a very objectionable feature, and we have been doing what is necessary to tone down that color without cutting down the efficiency or power of the lamp. That lamp in the corner (indicating) is one of the latest fluid lamps, and in my opinion is showing a yellow light. The one which Mr. Cline says has been in use about a year, was made out of the original fluid, as the slightly greenish tinge, which is apparent even to me, indicates, and I acknowledge it; but the other we claim is an absolutely yellow light. We are not content with what we have accomplished, but think we have produced a marked improvement in gas burners. In reference to the lighting of the lamp, and the explosion which occurs in the chimney, that feature will occur, more especially if the chimney happens to be a little cool and the match is applied to the lamp immediately; but if a reasonable time, say two or three seconds, is allowed, the chimney will fill up with gas, and it will light with a puff, and there is no danger at all. There is a way of closing the air shutter so that you can light it without that draft, but you cannot expect people to do that. Now as far as the life of the lamp is concerned, whether it will last longer from continual burning, or putting it out and lighting it again, the only chance of its breaking is due to the concussion which occurs in the chimney, and as persons become familiar with it they can overcome that. The mantle will last just as long, and burn as long, and will not deteriorate any more, by burning it part of the time, than to burn it continuously. We have in our factory lamps which have been burned over 9,000 consecutive hours.

Mr. Gwynn—I would like to ask whether the life of the lamp is as long with natural gas as with artificial?

Mr. Mason—I think we have been agreeably disappointed in our artificial lamps. We have put up a great many lights, and in putting out lights we generally look ahead for the renewals which are bound to come, making our provision for this purpose. It has been, basing our opinion on the renewals for natural gas, our experience that with artificial gas we considerably overestimated what the requirements would be, and instead of excessive demands for renewals, we have very few. We find ordinarily that about two renewals to the lamp will be sufficient for a year. The mantle made to-day is a tougher one than the one put out a year ago, and yet the mantles put out a year ago, which you may see, have burned in continuous service for a year. In natural gas mantles we estimate about 3 renewals to the lamp. There is a natural gas burner on that bar (indicating), filled with a natural gas mantle. Now, down here (indicating) these straight chimneys are constructed for artificial gas. The artificial gas lights have a band around the top of the chimney, with supports running up, which prevents any contact in the chimney and fracture of the mantle by knocking the chimney against it. That feature does not appear on the natural gas lights. The small globe (indicating) and the bulb chimney are used on natural gas, and it is a very easy thing in taking them off to break the mantles. The same thing does not occur with the artificial lamp, but we do not use that form of burner on artificial gas. We simply put them up because Mr. Butterworth said this morning, in his address, he thought gas men should look around for something attractive, and we wanted to show you we were in that line, and making a little progress.

Mr. McDonald—I find the most fruitful source of breakage is the forming of a little hole in the mantle through which the gas passes and breaks the chimney.

Mr. Mason—That is a feature which I think Mr. Greenough was referring to when he said that the manager, Mr. Mohler, of the English Company, contended it was impossible to use these burners in any other town than the one where they were manufactured—in other words, the mantles would have to be made in the town where used. We have a great deal of trouble on account of the mantles being fractured in transportation. The inside of the mantle is granular in substance, and therefore susceptible to fracture. It is dipped in crystalline, which is a cellulose preparation, and being a flexible material will not show any fracture which occurs in the mantle. At the same time the oxide might become broken. Now, if one of these granular particles becomes separated after you burn your crystalline, it is possible, in fact it is very often the case that it will allow a slight contraction, developing a hole, and as soon as that hole occurs, if it happens to be about half way down the mantle, it will permit the gas to go through there and play on the chimney, resulting in too rapid an expansion of the chimney, and when the light is turned out there is an irregular contraction, quite frequently breaking the chimney. Where a person finds these holes, instead of putting the mantle out in this condition, it would be better, in order to prevent dissatisfaction to the user of the light, caused by the breaking of the chimney, to substitute a perfect mantle. If, however, the fracture is at the top of the cap, you can lower the mantle sufficiently to prevent any gas getting through and coming in contact with the chimney.

Mr. Somerville—The experience I have had has not been quite so favorable as that we have heard to day. When the natural gas came into our city so also did the Welsbach lamp, and for a time I thought we might as well close up the gas works at once. They came in by the car load, and it was just a foregone conclusion that we fellows were going out to see what we could do at farming—raising cabbages and such things. Five hundred of our meters came in in one month, and about 300 the next month. They were selling gas remarkably cheap, putting in lamps at 20 cents a year, the consumer to pay for the renewals. Well, it did look rather hard. We could not compete with that at all, and a proposition was made that our Company buy the Welsbach people out. Our Company did not do it; they thought they would wait and see. Whether it is due to the peculiar quality of the Indianapolis natural gas, I cannot say—the burners did not give satisfaction. I think they attributed it to the sulphur in the natural gas, which rapidly destroyed the mantle. At any rate they, in a great measure, discarded them. At that time, it may be, they were not in the same advanced condition that they are now. I am glad to see there is a great improvement in the lamp. At any rate, the consumption of the Welsbach lamps did not continue, and we gradually got our consumers back again, until all the meters were put back and a great number more. Only the other day a gentleman who had been burning the natural gas with a Welsbach burner, and who lives in a very fine house, too, stopped me and asked me what I would charge to connect up with artificial gas. He has built a very fine house and did not run the service pipe for artificial gas. I told him what we would charge to put in the artificial gas, and take off the Welsbach lights and put on burners; and he said, "Do it right away; that thing has cost me $6 in the month of January for renewals." So we put in the artificial gas, and that thing is going on all the time. I do not know anybody who is using the Welsbach burner with artificial gas in our city, it has shown such disadvantages with the natural gas. In some little places with which I am concerned the Welsbach burner is received with great favor by the people, who are delighted with it; and I think we are going to do quite a business taking out the electric and putting in the Welsbach lights.

Mr. Cline—The natural gas people in Springfield undertook to light their own offices with a Welsbach lamp and natural gas, but failed utterly, and are now using the Welsbach burner with artificial gas, lighting their offices in that way to day to do their business by.

Mr. Mason—At Indianapolis, like many other places, we have not attempted to do anything with artificial gas, simply because we heard no complaints from the use of natural gas, and we thought it was better, inasmuch as we had more than we could attend to outside, to let Indianapolis alone. There are many other towns where we have been compelled, owing to the excessive demand, to decline to do anything; but we hope the time will come when we will help you out with our light.

Mr. Chollar—Our experience with the Welsbach burner in St. Louis has been quite limited so far as the gas company is concerned. An agency there sells the burners, and at the present time they are putting a great many in; so many that there are gas consumers who, on applying for the burners, have to wait for two or three months to get them. They seem to give great satisfaction. However, I have made quite a number of experiments with the photometer on the burners, and so far I have been entirely unable to get any such results as those I have heard here to day. I don't know what kind of mantles we have had, but about 12 or 13 candle power to the foot, with a very careful experiment, checked by three or four persons, was about all we have been able to get. At the present time they seem to have been replacing or displacing the electric light, much more than the gas light, and we are very much pleased in that respect. They are going into stores very largely—drug stores, cigar shops and such places; but, so far as residences are concerned, very little is done. The burner is in great demand and the people are entirely unable to obtain a supply. The trouble is now that they have to wait so long before getting them, but when they get them they seem to give great satisfaction.

Mr. Gwynn—What was the candle power you stated you obtained?

Mr. Chollar—I think from 12½ to 13 candles. I have seen a standing advertisement, in some of the gas papers, of 25 candle power to the foot, but I have not been able to approach anywhere near to it.

Mr. Gwynn—What was the length of the bar you used in testing?

Mr. Chollar—The bar was 2 meters long. The subdivisions were all made in millimeters.

Mr. Gwynn—What did you test it against; double or single candles?

Mr. Chollar—We tested against a slit which we calibrated very carefully with a candle. In testing the slit we checked it with four observers, and the difference between the four observers was very slight; then we took four observations on the Welsbach lights, and the average was about 12 or 13 candles. I noticed in the advertisements about 25 candles to the foot. The mantle was not the same number that we had, and the discrepancy was probably due to the difference in the chemical solution, which the gentleman speaks of, or there is something about th mantle; but we have been unable to get any such results. We are very well satisfied that it does not give more, so far as we are concerned.

The President—Are you encouraging the introduction of the burner? What is your attitude toward it?

Mr. Chollar—We encourage it very strongly where they are using electricity.

Mr. Gwynn—I made some experiments 7 years ago with the old burner, on natural gas drawn from an experimental holder, under a uniform pressure at all times the same as artificial gas, and we got as good results from the natural gas. I think the trouble with the natural gas is due to the variation of the pressure.

Mr. Miller—I would like to say a word about Mr. Chollar's way of testing that burner. Mr. Chollar said he tested it against a slit, which he very carefully calibrated with a candle. When he tests the candle power of the slit his screen is near his candle, comparatively, and some distance from the slit. He then takes away the candle and puts the lamp in its place, and then his screen is up close to the slit and far from the lamp. The amount of parallax is very great, because the screen is not against the flame. He will find, if he tests the candle power of his slit with the screen in the place where it was when he tested the Welsbach burner, that the candle power of the slit would be much greater than it was when the screen was at the other end of the bar.

Mr. Chollar—I agree with Mr. Miller in that respect. The matter of parallax is the cause of the inaccuracy in the use of the photometer. The greater the difference in the size of the lights compared, the greater the parallax, and consequently the greater the error. It makes all the difference in the world how you make the experiment. Now, if I were making photometer experiments for you, with a burner, the first question would be, "Do you want a favorable or an unfavorable report?" It is easy to get any kind, as a matter of fact, and as an instrument of precision the bar photometer of the present day is far from being reliable. It discriminates in favor of the light of smaller size and higher intensity.

The President—I would like to ask Mr. Mason what photometer they employ.

Mr. Mason—I think it is a 60-inch bar photometer, with a standard argand burner, and is read from the screen.

Mr. Nash—I think so long as you have the heat units you can get a high candle power.

Mr. McIlhenny—It may be of interest to state the result of a test of the Welsbach light in a store which I know of, and which, prior to the time of using the Welsbach light, had been paying the electric light company a bill of $13 a month for incandescent lights. After the Welsbach lights were put in the bill was less than half—not more than $6 a month.

The President—I think, gentlemen, without waiting for the formality of a motion, I will tender the thanks of the Society to Mr. Cline for his valuable paper. The next paper is that of Mr. W. H. Anson, Inspector of the Columbus Gas Company, on the subject of

TESTING GAS METERS.

The testing of consumers' meters is one of the necessary features of the gas business, and in most cases a profitable one for the companies. There are various reasons and causes why meters are obliged to be tested, and in testing them, attentiveness is necessary in order to insure a satisfactory result. Meters should be tested when received from the factory and before being placed in use; when one customer ceases using gas and another tenant takes possession of the premises; when being repaired; when they have been in close proximity to a fire or intense heat; when they have been submerged in water, or subjected to a stream of water, as in case of a fire; when they have been frozen; when they have received a severe jar caused by a fall; when "suspected" on the part of the gas company; and when complained of or "contested" by a customer. A little negligence or inattention on the part of the person testing a meter, may result in more or less unpleasantness to the customer of the gas company, or both.

Of all the foregoing reasons for testing meters—and there are others—the one which might possibly be termed the most important is the "contesting" of meters; for a complaint from a customer is almost invariably called forth by "too large a bill," and it is seldom you hear complaints of the opposite character. I, therefore, term this reason the most important because of the fact that, in addition to testing the complainant's meter, it is well to institute at the same time a thorough investigation of the premises for possible causes of "too large a bill," other than an incorrect meter. It is more important for the reason that circumstances have thus permitted you to give this customer your special attention, and for this interest you have taken in him, he forever becomes a friend of the gas company. Investigation of premises, in connection with testing a complainant's meter, has disclosed such possible circumstances, for instance, as a clothes line attached to a gas pipe in an attic, which had in some manner partially broken apart the gas pipe at a joint, and the attic being seldom entered, the leak was not noticed by any of the occupants of the dwelling, as the gas escaped through the open attic windows, and was not discovered until a man from the gas office had been sent to bring the meter in to test it.

On another occasion, while investigating a complaint that the "meter must be wrong," an inner room which was somewhat isolated—having but one window and no other inlet for daylight, and an adjoining building being so closely situated as to almost exclude daylight from the room—was found wherein it was necessary to use gas in the daytime, and circumstances required the burning of gas in this room from 12 to 14 hours almost daily, and a test of the burner showed that about 9 feet per hour was being consumed. This fact accounted for a large per cent. of the gas used on the premises. In both the foregoing instances the meters were tested, and the persons who had complained were thoroughly satisfied with the result of the action taken by the gas company in the matter, as they necessarily should be. Many times complaints of "too large bills" are satisfactorily explained in the office of the gas company, and are, therefore, not made matters of record. But the testing of complainants' meters, and the investigation of premises for "causes," should—for the sake of reference if nothing else—be recorded. I think the meters in use at present, and as made to-day, can be favorably compared, in respect to accuracy, with good watches.

During a portion of the year just closed there were several complaints received from customers as to their meters being wrong. One-third of these meters tested 100 per cent. (or correct); one-third of them tested 3 per cent. fast (or averaged 97 per cent.); and one third of them tested 2.1 per cent. slow (or averaged 102.1 per cent.) The total average of these meters was 99.7 (or 3-10 of 1 per cent.) fast. As is known, under the prevailing custom, based on English law, a meter is approximately correct, and is accepted as such, when varying 3 per cent. fast or slow. One of these meters tested 90 per cent., or (allowing the 3 per cent. variation which is thus allowed) 7 per cent. fast. Another tested 106 per cent., or 3 per cent. slow. The time in service of these meters was about six years, and they were, for the most part, repaired meters.

During the months of June and July last it was surmised that some of our meters had ceased registering, as the statements taken during these two months had shown such to be the case, and a general testing and investigating "crusade" was inaugurated among the meters. Those

meters which had been suspected as being non-registering, were the first to receive attention, and the result of the testing and investigating showed that out of about 5,000 m ters tested, about 1½ per cent. of them passed gas without registering the same. An investigation of the cause thereof showed that in almost every instance there had accumulated upon the valves and valve stems a peculiar hard, dry, gray deposit. The substance had so accumulated as to cause the parts to work hard, and the valves to be raised, and the valve arms and stems to be bent, thus permitting an uninterrupted flow of gas through the meter without registering. This substance also deposited on the inside of the meter inlet and outlet pipes. About this time (in July) we had occasion to rearrange a 1¼-inch service pipe which had been in use about three years, and which was located about two squares from the gas works. On cutting the pipe in two, a great quantity of black, finely powdered substance issued from it. On securing and examining a small portion of it, it was found to resemble lampblack. It was very light and seemingly free from grit, rust or sandy substance of any kind. No conditions had been altered at the works; the same kinds of coal, purification, etc., were in use, and the substance could not be accounted for. A small quantity of the deposit in the meters was secured and submitted to a competent chemist, who pronounced it to be entirely free from sulphur or sulphur compounds; but he could (or did) not determine the nature or cause of the mysterious substance. This annoyance disappeared as suddenly as it came, and has not since reappeared. The meters most affected were the smaller sizes, divided as follows:

3 light..67.7 per cent.	10 light..3.5 per cent.	45 light..1⅔ per cent.
5 " ..21.0 "	20 " ..6½ "	

These meters were of various makes and were all affected alike. After the weeding out of the suspected meters had been completed, a general testing of all meters was commenced. About 5,000 meters of various sizes were thus tested, divided as follows:

3 light...47 per cent.	20 light... 3 per cent.	60 light... 1 per cent.
5 " ...37 "	30 " ... 1 "	100 " ... 1 "
10 " ...8½ "	45 " ... 1 "	200 " ... ½ "

50.3 per cent. of these meters tested slow, 31.1 per cent. tested fast, and 18.6 per cent. tested correct. The average per cent. of the 3 light meters was 98 per cent., the 5 light, 105 per cent., and the 10-light, 105.2 per cent., or a total average of these three sizes of 102.7 per cent. In calculating the percentages of these three sizes of meters, none but those varying more than 3 per cent. from absolutely correct (or 100) are considered. These three sizes of meters—3 light, 5 light and 10 light—represent about 93 per cent. of the meters tested, and show very favorable results. The larger sizes, from 20 light to 200-light, inclusive, represent about 7 per cent. of the meters tested, and the percentage of each of these is considered in the following calculation:

Of the 20 light, 54½ per cent. were slow, 26⅔ per cent. were fast, 19.1 per cent. correct; or a total average of 100.7 per cent. Of the 30 light, 36.3 per cent. were slow, 50.9 per cent. were fast, 12.8 per cent. were correct; or a total average of 97.7 per cent. Of the 45-light, 41 per cent. were slow, 38 4 per cent. were fast, 20.6 per cent. were correct; or a total average of 99.7 per cent. Of the 60-light, 22.8 per cent. were slow, 50 per cent. were fast, 27.2 per cent. were correct; or a total average of 99 per cent. Of the 100-light, 33⅓ per cent. were slow, 27.8 per cent. were fast, 37.9 per cent. were correct; or a total average of 99.8 per cent. The 200 light meters, representing but one half of one per cent. of the total meters tested, showed that 20 per cent. were slow, 80 per cent. were fast, none correct; but gave a total average of 98.7 per cent. The total average of the 20-light to the 200 light meters, inclusive, was 99.3 per cent., or .7 of 1 per cent. fast. The non-registering meters are not considered in the foregoing calculation.

The non-registering meters consisted of 67.8 per cent. 3-light, 29.9 per cent. 5 light, 3.2 per cent. 10-light, 6.4 per cent. 20-light, 1.7 per cent. 45 light. The total average of the meters tested (about 5,000, including new and repaired meters), was 100.2 per cent.—not considering, of course, the non-registering meters and those which could not be tested for various reasons—or ¼th of 1 per cent. slow.

	The Slowest.	The Fastest.
3-light tested	145 per cent.	69 per cent.
5 "	120 "	81 "
10 "	119 "	88 "
20 "	116 "	90 "
30 "	105 "	92 "
45 "	106 "	92 "
60 "	102½ "	90 "
100 "	103 "	95½ "
200 "	101½ "	96 "

While conducting this testing "crusade" some facts were discovered which might not have been found under ordinary circumstances. One meter was found which tested 69 per cent. Several were found which tested from 120 per cent. to as high as 145 per cent. Some were found which, upon being tested under different conditions, gave various results; as with the normal outlet, a meter would indicate from 5 per cent. to 20 per cent. slow, and when tested with an outlet of about 5 feet per hour, such as a night light, a cigar lighter, or like condition, no registration would be shown. Occasionally one was found which was located in a damp place, and having been there some time, an accumulation of dirt and dampness together had formed a coating of clay around the lower part of the sides and back of the meter, and when this coating had been cleaned off, it was found impossible to test the meter, owing to the fact that the meter had become almost entirely destroyed by rust, and this formation of clay was the only thing that prevented the gas from escaping through the rusted-out parts. Another meter was tested several times, and each time was proven correct, but when set in use, and in different places, no consumption of gas was shown. On opening the meter, it was found that, during the course of repairs, a very small particle of solder had become lodged in such a manner as to permit the test dial to work properly, but clogged the workings of all the other dial hands. This was discovered by passing 100 feet of air through the meter, and showing that the right hand dial did not move. Many of the slow meters were those that were in use where other illuminants were used, and gas was not used entirely, but kept only for emergencies. This was particularly true of the 20 light meters, for many of them were located in places where other illuminants predominated, and artificial gas was used only for night, or watch light purposes, or where the consumption was very small. In doing this work the meters were removed and others set in their places, the removed ones being brought in to be tested. The cost of doing this in this manner (exclusive of making the repairs) was about 20 cents per meter. Query: Did it pay or not?

It has been the custom of this company to test the meters over the city every three or four years; but owing to the fact that so many non-registering meters were found early in the season, it was thought advisable to make a general and thorough test of practically all the meters in the city.

Discussion.

The President—I hope, gentlemen, you will discuss this paper in a lively way.

Mr. Coombs—Do you change the meters when they register within 3 per cent. fast or slow?

Mr. Anson—No, sir; we do not.

Mr. Coombs—Do you put them in and use them as correct?

Mr. Anson—Yes, sir. If a meter tests 97 or 103 we consider the meter approximately correct. We do not open it to adjust it at all.

Mr. Coombs—Do you find in testing meters a number of times that it varies the per cent.? Did you ever have any variation in the tests?

Mr. Anson—As a rule we test a meter two or three times. If the result of the test the second time is not the same as the first, we generally test it the third time, and if we find no variation in the three or four tests to exceed half of 1 per cent., or 1 per cent., we do not open the meter to adjust it.

Mr. Coombs—Suppose you tested a 3 light meter and found it to give you 2 per cent. slow, and on changing the outlet and making another test you found it 1 per cent. slow?

Mr. Anson—In the cases I refer to here, our testing was so general we did not have time to spend in making tests in that way. We followed our normal way of testing meters; but meters that we had any reason to think would require a deeper inspection, as if, for instance, a meter varied from 1½ to 2 per cent. after being tested three times, we would invariably open it; but we never made any difference as to the outlets.

A Member—What size was the outlet you used on the different kinds of meters?

Mr. Anson—I think the outlet is 18 feet on a 3-light meter.

Mr. Allen—I would like to ask whether or not it pays to test meters? It surely always pays to know that you are right before going ahead. Not only does it do justice to our consumers that the meters be correct, but we should know them to be correct in order to have confidence in our own business. Should a dispute arise as to the amount of the gas bill, it is better to treat our customers as friends than as enemies. The customer is generally sincere, though he may be mistaken, and before accusing him of making an unfair or unjust claim, we had better know that we are right. While meters as a rule do not register in favor of the gas company, though there be but 1 in 1,000 registering fast, so far as the consumer who is using the meter is concerned, they might as well

all be fast. It is a serious matter for a company to have a gas bill presented in which there is an error, no matter from what source that error arises, and we should take no chances that can be avoided of making an error. A suspected meter should be tested as soon as the doubt arises of the accuracy of its measurement, and all meters should be tested frequently.

Mr. Anson—I should like to say to Mr. Coombs that in testing meters we sometimes put on an ordinary burner and use, say, a 5 foot tip, and we would find different results in that way. By testing with an ordinary outlet we would find the test, say, 105 or 106, and by using the ordinary tip the chances are it would register or test 120 or higher.

Mr. Coombs—You take the ordinary standard outlet as your test and read the meter on that standard?

Mr. Anson—Yes, sir.

The President—I think Mr. Allen's remark that a good average is not a very strong virtue in the meters of a gas company is a very good one. If they average a small per cent. against the company it does not signify much to the consumers who are paying for more gas than they get.

Mr. McIlhenny—I think Mr. Anson has given us a very interesting paper, and he has certainly gone quite deeply into this subject, giving us the percentages of the various sizes. On the whole, I should say it is very gratifying to know that he should test 5,000 meters, say, and find the average was not more than one fifth of 1 per cent. out, and that in favor of the consumer. Now, take a meter. It is an instrument that is put in the cellar and not touched, and I believe this instrument would compare very favorably with any other instrument or machine that is made. No steam engine or number of steam engines made can show such an average, after having been in use for a number of years, and they always receive careful attention, while a meter does not. It works for a number of years without receiving any attention whatever, and to have the instruments show an average of this kind, seems to me very gratifying. In reference to the matter being deposited in the meters and giving trouble, it is of course very difficult to say as to the origin of it, and it is also occurring in pipes, and particularly at their inlets and outlets. You will see this material deposited wherever the gas met an obstacle in its flow, and I think it must have been something held mechanically in the gas. The gas maker can tell better what the cause of it was than anyone else. The paper states that the slowest 3-light meter was 145 per cent. and the fastest 69 per cent. That would apparently show that that size meter was erratic; but if we consider the number of 3-light meters used was vastly greater in proportion to the number of other sizes, and when we consider the liability of an error where you have a great number, I think possibly that can be accounted for in that way. On the whole, I would say that this is a very interesting paper, and the question with which Mr. Anson winds up his paper, "Does it pay to attend to the meters?" is, I think, a very good and very valuable one. I think that going over meters and testing them at stated periods is a very profitable thing for any company to do. Of course, meters have different circumstances surrounding them under which they do their work. They may be located in a warm place or in a damp place, and consequently may cause varying trouble. It may also be subjected to steam sometimes, or various atmospheric conditions, which would cause the outside casing to rust, and by bringing them in occasionally and giving them a coating of paint their life would be very much prolonged. You know the average of all the meters is correct to the consumer and correct to the company. Gas companies never desire to make the consumer pay for more than he gets. I don't believe there is any business in the world conducted more honestly than the gas business. I have never seen a business where the people engaged in it were more solicitous of giving full value to the consumer. Everything is being done, I think, to give the consumer all he wants, and as soon as the public generally can be made to believe these facts, the life of the gas manufacturer will be much happier than it is to day.

Mr. Somerville—I have a little memorandum here that may be of interest in connection with this paper, of meters which I have tested during the course of one year. We bought 419 and every one was correct. We tested 209 consumers' meters; the number slow was 53, the number fast 40 and the number correct 116. Per cent. slow, 8 6; per cent. fast, 7 3; consumers' meters, per cent. correct, 56; per cent. slow, 25; per cent. fast, 19. I wish to correct Mr. Anson in one thing. He said 3 per cent. fast or slow. I think the English law reads 3 per cent. slow and 2 per cent. fast.

Mr. Coombs—I notice that Mr. Anson's paper gave quite a number of reasons for testing meters, and among that number is one where the consumer makes complaint that his bill is too high. Now we find very many instances in our place where meters are brought in by consumers who think their gas bills are too high and their meters too fast, and as a matter of courtesy we generally test the meter. Now, perhaps in 9 out of every 10 of such complaints, you will find the meter correct. While it would not be good policy to refuse to test, at the same time it is an unnecessary expense to which the company is put. What is the custom in reference to such work? If a meter is brought in and found to be correct, I would like to ask whether any charge is made for the test against the consumer, and if it is found to be incorrect whether the gas company stands the expense of it? This is bringing the matter into the shape of justice to the gas company and to the consumer. There is a great deal of work done that way which is very expensive to the gas company. I would like to hear from Mr. Butterworth.

The President—The testing of meters for consumers free of charge, under such circumstances as Mr. Coombs designates, is part of the gas business. We must do these little things for our customers. We have to reconcile ourselves to that fact. We have to show them some attention.

Mr. McIlhenny—Partly in reply, I would say that wherever statute laws govern the testing of meters for consumers it is stipulated that if the meter registers in favor of the consumer, the consumer is to pay all the expense, but if in favor of the gas company, the gas company pays the expenses. If a meter that comes in registers slow, the gas company are so glad to know it that they don't think of charges, and if it is fast they usually aim to shut him up as much as possible.

The Secretary—I think there is such a law in this State. The discrepancy of 3 light meters, I think, is accounted for in the spasmodic way in which they are used. They are principally in office buildings, only used a few minutes at a time, and sometimes only a few times in a month, thus allowing the diaphragm to become dry and hard, and I think that accounts for the irregularity in the tests of meters.

On motion of Mr. Allen, a vote of thanks was tendered to Mr. Anson, and also to Mr. McIlhenny.

The President—The next paper will be that of Mr. R. Watt, upon the subject, "Coal Tar Pitch; Its Uses and Future Market." Before this paper is read, however, I would like to read a telegram from Mr. Slater, Secretary of the American Association:

PROVIDENCE, R. I., March 21st, 1894.

To IRVIN BUTTERWORTH, Columbus Gas Works—I desire through you to ask the Ohio Gas Light Association to give to the Council of the American permission to present to the American, from time to time, for discussion, a selection from the papers of the Ohio Association. See AMERICAN GAS LIGHT JOURNAL, March 19th, 1894, page 410, for particulars. A. B. SLATER, JR., Sec.

The Association as such cannot act in this matter, as the papers belong to our members. The members are at full liberty to furnish a copy of their papers to the American Association if it wants them, and I think the members should be requested to submit their papers to the American Association. I do not think there can be any objection, and I will instruct the Secretary to inform the American Association that the members of this Association will be pleased to co-operate with them.

Mr. Watt, of Chicago, then read his paper on

COAL TAR PITCH; ITS USES AND FUTURE MARKET.

Coal tar pitch 25 years ago was comparatively a new factor in the commercial world. It was almost unknown. Whenever pitch was mentioned the mind of the merchant or manufacturer reverted to the pine tar product of North and South Carolina. Even the gas companies of the United States were ignorant of the commercial value of tar. Instead of turning it into a source of revenue, their main object was to dispose of it in a way that should not pollute the rivers or streams near their works, and cause a public nuisance. Consequently they wasted millions of gallons of tar, which, if turned into pitch and the avenues of uses had been opened to it, would have largely augmented their revenues. As a result of this lack of foresight, consumers not being educated in its uses, were limited to the use of pine tar pitch and resin for roofing and other purposes. When pitch was placed on the free list, foreign pitch was reduced in price and came into general use in this country, largely owing to its cheapness; but it was often of such poor quality that it was unavailable for many of the functions of pitch. The cause of this poorness was obvious. Foreign producers, who were also little instructed in the advantages of pitch in its various lines, did not regard their product of much importance, and thought that anything would suit so long as it was called pitch. They distilled the tar mainly for the resultant oils and chemicals, and pitch with them was only a bye-product of many impurities. It was usually hard and brittle, and contained many foreign substances which were detrimental to its utility. Its importation, however, brought pitch into more general use by reducing the price of what pitch was manufactured in this country.

Now, while this result curtailed the revenues of the gas companies engaged in the production of coal tar, it also stimulated them into better appreciation of the commercial worth of the product. The tar distillers revised their methods of manufacture, and sought to meet the necessities of the growing market. Instead of treating pitch as a bye product, as many of their European competitors still do, they now distilled the tar solely for the pitch, and looked upon the resultant oils and chemicals as the bye products of secondary interest from a commercial point of view. Owing to this change of front on the part of the distillers, the coal tar pitch of the United States takes first rank in the market. It is free from the impurities of the imported article, and therefore better adapted for the various purposes for which coal tar pitch is now used.

In this brief paper I need only call attention to a few of the leading uses of coal tar pitch. For roofing purposes it is unsurpassed, and is in general vogue in all our large cities. Its superiority over tin and iron roofs is everywhere admitted. During the past 15 years it has become the principal factor in nearly all the prepared roofing on the market. A combination of pitch and felt resists the action of water much longer, and is more durable than any other class of roofing material; and, what is of equal importance, the cost of such roofing is one third less than roofs of tin or iron. It moreover makes a much safer roof in case of fire. While the metal roofs disjoint and fall to pieces from the action of heat, and thereby add to the intensity of the fire, pitch roofs fall down bodily and tend to smother out the flames, and in this respect ef fect a much quicker result than thousands of gallons of water.

In street paving the advantages of pitch have frequently been demonstrated. In many cities specifications call for from 10 to 20 per cent. of refined Trinidad asphalt, added to the pitch or cement employed in paving; but this clause is rarely complied with. Practical men know that the addition of this asphalt is more of a detriment than a benefit to the pavement, and they condemn and reject it, even when set forth in the specifications. City authorities, as well as contractors, know that block stone pavements are not satisfactory or durable, unless pitch has been used for filling the crevices or cementing the blocks together. Years of costly experiments were needed in many instances to substantiate this fact; but to day pitch filling is regarded as of the utmost importance, since pavements so treated are more lasting and less subject to ravages of water than those which have been laid without pitch as cement and filler. Indeed, pitch pavements are practically impervious to water, and accordingly escape its corrosive or undermining effects.

In Eastern, Central or Southern cities, where brick pavements have largely superseded all other styles, it has been proven that without a pitch filling such pavements are like leaky roofs in wet weather. The rain percolates through the crevices and injures the foundation, render ing repairs necessary in a very short time. Pitch, on the other hand, prevents the bricks from absorbing moisture, effectually seals up the joints and keeps the pavement firm and intact. Should the pavement sink from any cause, the points of fracture join naturally together again; whereas, with hydraulic cement or mineral grout of any kind, breaks and cracks are hard to repair, and pavements so laid soon present a ragged and uneven surface.

Coal tar pitch was extensively used for the vulcanite asphalt pave ments in Washington, D. C., which are admitted to be the finest in the country. A recent estimate shows that 1,500,000 yards of asphalt and 500,000 yards of vulcanite have been laid in that city with pitch or coal tar distillate; and in all instances where the proper ingredients or proportions have been used, the results have been in the highest degree satisfactory. Pitch is also used to excellent purpose in floorings of es tablishments where there is much moisture. Where oils or acids are liable to fall, an asphalt floor laid with pitch is superior to asphaltum alone. Petroleum softens asphalt, but it has no effect whatever on a floor of coal tar pitch. These facts have been recognized in numerous cities. In Pittsburgh, Pa., fully 80 per cent. of the asphalt pavements have been laid with pitch with splendid results.

But there are other and equally important avenues for the employment of coal tar pitch. It enters extensively into the manufacture of carbons for electric lighting. Various substitutes for pitch have been tried, but none have thus far proved successful. In Germany it is used in the manufacture of pipes for the conveyance of cold acids in chemical works, and also for lining acid holders. Underground pipes for gas or water are coated with pitch to prevent rust or corrosion. Boat bottoms are pitched to preserve the timber and give a smooth surface. The wooden pipes, manufactured in Michigan and New York, are made more useful and durable by their pitch coating.

Another important use for coal tar pitch has been found in the manu facture of egglette coal, the new fuel which bids fair to revolutionize the market. This fuel is made of hard and soft coal dust, mixed with 10 per cent. of pitch and pressed into egg-shaped pieces. Its popularity for family and manufacturing purposes is already so pronounced that factories for its production are contemplated in various sections. This industry will undoubtedly give great impetus to the pitch market. Even the dust and screenings of the mines can be converted into as valuable a fuel as hard coal, while many grades of Western coal can be rendered bituminous by the use of pitch as a binder. All the indications are that the demand for the new fuel will go on increasing. In England its manufacture and sale have already reached large proportions, and egglette has given great satisfaction whenever tried.

Owing to the manufacture of gas from petroleum products, of late years the supply of coal tar has diminished. A quantity of pitch obtained from gas tar derived from petroleum products, has been used for paving and roofing purposes; but the large percentage of water in the tar has rendered it very difficult to handle. While the pitch made from this tar is not as good as genuine coal tar pitch, yet the cheapness of the tar has forced it into the market as a substitute for many purposes, with fair success.

The expanding market, as well as the revenue from the production of pitch, ought to stimulate the production of coal tar, and tend to the diminution of gas making from petroleum. When the gas companies fully realize the conditions of the market, they will no doubt govern themselves to meet those conditions in the most profitable manner. Besides those already referred to, there are hundreds of avenues, some of them individually small, but large in the aggregate, for the consumption of pitch. Indeed, taken altogether, the outlook for this valuable product of coal tar is very promising. With the increasing demand for felt roofing, the growing popularity of brick for paving, where pitch will in time be universally used for filling, the employment of granite block for paving with pitch filling, the extension of electric light, causing a larger demand for carbons, and the expanding consumption of the new fuel, to say nothing of the many minor avenues of use, the producers of coal tar pitch certainly have every reason to expect a bright and profitable market.

Discussion.

The President—Gentlemen, I hope this subject will receive a thorough discussion. It is before you for that purpose.

Mr. Nash—I am very glad to know that the outlook is so favorable. Can Mr. Watt tell us whether the price at the present time has any tendency to go up with the increasing demand?

Mr. Watt—Well, the price seems to keep up fairly well. There are indications of its going down, but it usually keeps up.

Mr. Nash—I presume the competition with foreign pitch has a tendency to reduce the price.

Mr. Watt—Yes, sir; that has reduced its price, because there they regard it as a bye product. They formerly used to throw it away, virtually.

Mr. Holmes—This question is somewhat allied to the matter that the Tar Committee had in charge, I believe, and these papers were sent around to the various gas companies, including ours, and for lack of special information upon the subject I scarcely knew how to make reply. I suppose the President expects at this time that some of this information will be brought out, with a view of learning something about it. I have made some inquiries, however, in this matter, as my limited opportunities afforded, and I found that, regardless of the opportunities that there seem to be for making money in this business, it has scarcely been entered into by any gas company, but seems to be entirely controlled by the chemical companies. I think I heard of one exception, which was at Indianapolis, and I believe I was informed also, that that was a failure. Now, if that was the case, it might be well at this time to bring out the cause of the failure. If it was a failure, how can we make a success of it?

The President—Mr. Somerville is the man to answer that question, I should think.

Mr. Somerville—The distillery there was commenced with a small capital. Then the panic came along, and as they could not borrow money very handily, they consented to go into the hands of a receiver. The works are now double the capacity they were then, and they cannot get out their orders. It is now in the hands of a company with plenty of capital. I was very glad to listen to Mr. Watt's paper about coal tar and its uses, and the future market. I really thought, though, he would tell us a little different from what he has. I thought perhaps he was going to direct our minds to the fact that in a little place called Peebles, in Scotland, is a plant getting 14,000 feet of 22 candle gas out of a ton of tar and, 1,300 weight of hard coke—96 per cent. carbon, which is eagerly sought for by brass founders and others. I made some sort of a calculation, and think it is in such directions we will have to look for

the future use of coal tar, converting it into a high candle gas and selling the coke. I have been thinking over that for some time. I think for two years it has been in my mind that that was the proper thing to do with our tar, and I have often thought if I was constructing a new retort house I would have some means for the tar, as it comes from the hydraulic main, to get into a still and have the oily matter distilled and go into the hydraulic, and the residue drawn off as pitch. I think it can and will be done, and I think we will get a much better price, and just put the oil and hydrocarbons into our gas, where they belong, and where they are worth more than anything else, and sell the pitch, as pitch, right from the works. Instead of selling tar we will sell pitch. I want to say to some of these young men who are contemplating improving and building retort houses, I think it can be done.

Mr. Miller—Mr. President, I would like to remark in regard to the paragraph which says, "A quantity of pitch obtained from gas tar, derived from petroleum products, has been used for paving and roofing purposes; but the larger percentage of water in the tar rendered it very difficult to handle," that it is entirely unnecessary to have water in the tar—that it can be separated. The question recently came up with me, and I wrote to two water gas companies for samples of tar, without telling them what I wanted with it. I analyzed them. I distilled them, raising them to 240°. In one case there was water and in the other no water. In one case I got 1½ per cent. of light oil and not a trace of water; in the other, at 240°, I got about 12½ per cent. of light oil and ¾ of 1 per cent. of water. In the first case I was familiar with the works and knew exactly how the tar was separated. It was a works making from 160 to 180 million feet, and the only separator used was about 6 feet in diameter and 6 feet deep, having a partition in the middle. The tar was drawn from the works and went into one side of the partition, and from the other side the water was pumped, going back through the works again, and the tar went into a well. With that small separator, and with a 160 to 180 million foot plant, the tar was absolutely free from water; the main secret of it being that the tar separator was kept hot—140° to 150°. If that is done there never will be any trouble. If they will keep the separator hot they can separate the water from the tar and the tar won't foam.

Mr. Watt—The tar I have reference to principally was the tar produced by the gas companies in Chicago. That contains about 35 to 40 per cent. of water. They have made numerous experiments, but have never been able to separate the water from the tar without distilling it.

Mr. Miller—This tar I speak of was made on precisely the same apparatus that is in use in at least one of the stations in Chicago, and all of them are working on the same general principle. It is just the method of handling it; these Chicago people could easily separate it.

Mr. Watt—Well, Dr. Woodman tried several experiments, and I have seen several of the arrangements that he used in trying to separate water, but I think he never succeeded.

Mr. Miller—He has not tried the right one. If you visit Grand Rapids you will find it separated perfectly; also, in Omaha, Kansas City and other places.

Mr. Watt—The Omaha tar formerly contained a large amount of water.

Mr. Miller—Well, yes; three or four years ago it did, but in the last two years or so it has been almost absolutely free from water. One sample that I got there was absolutely free. Only ¾ of 1 per cent. was distilled over of light oil, and that distilled over below 240° without a trace of water.

Mr. Somerville—In this connection I would like to say I met the manager of the tar factory the other morning, who spoke to me about the water gas tar. He can't get enough of it. He is running around all over the country for it, for he has found that it makes a perfectly pure asphaltum—a valuable product. He keeps it free from the other tar, and says there is no difficulty in taking out the little water that is in it. He wants the water gas tar. He uses this asphaltum, I believe, to make a deodorized paper. The paper dipped in it has no odor whatever, and is therefore more valuable for some purposes.

The President—Mr. Welch, who has given the subject of tar probably more consideration than almost any of the rest of us, had expected to be present and speak on this subject, but has unfortunately been called out, and has requested me to read to you some remarks on this subject, which he has jotted down, and with your permission I will read them:

"The subject of coal tar and coal tar pitch has been a prominent one before our Association for the past two years. The high prices of '91 attracted attention to this product and opened up the realization that a part of our business had been neglected. This condition of things alarmed the tar refiners, who set about to avail themselves of the easy means of depressing the market, and who have now crowded us down to about $1.50 per barrel—a price scarcely equaling its fuel value. In 1890, prior to this revolution, tar was selling, in my judgment, at fair prices, namely, from $2.25 to $3 per barrel, and there is no natural influence, no apparent change in the supply and demand condition since that should depress prices so low as this $1.50, or nothing price. It is not the fault of the refiner, and I assure you he will not pay more as long as he has the present condition of the Ohio field to prey upon. The gas companies must help themselves, and no amount of begging will prevent a business man from taking advantage when he can practically put his own price upon a commodity. An attempt has been made by this Association to strengthen the position of tar in Ohio, and with very flattering results. It may require more than one year to educate the masses up to the policy of a joint distillery or State depository, and to a perfect plan, but the Committee has already the co-operation of a sufficient number of companies to render easily accomplishable such a course. The Columbus Company will take the initiative, and erect a still forthwith. This alone means 5,500 barrels off the raw tar market, with the opportunity left open for a limited time by the Columbus Company for joint ownership. At the worst, this affords other companies another bidder for their product. These are encouraging results. Tar must be kept off the market. It is the companies who have to sell who set the pace and make tar purchasable at $1.50 per barrel. Have it known that Ohio tar is not for sale; it's too valuable; there is no better tar made than Ohio tar. *Double, threefold* your storage capacity; force a local or home use for it; make it into pavements; compound a cheap paint of it; erect a crude still and produce pitch for your own town; advertise it; burn it; anything to get it off the market. I have not sold a barrel of tar to a distiller for the past three years, and have not a barrel of tar on hand to day; yet possessing a recently built storage capacity for two years' yield. This is the line on which we must and can protect ourselves. Mr. Watt has given us a very interesting paper upon the subject of pitch and the market. He is certainly in a position to speak as authority, and I am sorry that he has not elaborated more especially upon the pitch business; the process of manufacture; cost of manufacture; market price of pitch; what a fair price for tar is at the present selling price of pitch; what, if any, influence the alleged combination of tar refiners has upon the low prices offered to day for tar?"

Mr. Welch asks some very practical questions, Mr. Watt. Do you want to speak upon any of these points?

Mr. Watt—At the present selling price of pitch, tar ought to bring about 4 or 4½ cents a gallon at the still.

The President—What is the cost of distillation, Mr. Watt?

Mr. Watt—It runs about $1.40 per ton.

The President—For the finished pitch?

Mr. Watt—For the finished pitch. Tar will lose about 25 per cent. in distillation.

Mr. Gwynn—How is it for electric light carbons?

Mr. Watt—Distilled for that it runs 30 to 40 per cent. Some want it distilled down almost into a coke; some want it cooked a little harder than ordinary roofing or paving pitch, so that they can cook it down to what they require for their work. But the large proportion of the electric light carbon manufacturers have been importing Scotch and English pitch because they get it so cheap.

A Member—Is it as good?

Mr. Watt—I don't think it is as good. They get it cheap, and any little tempering it requires, or remelting, or boiling, of course they can afford to do. They can get it at almost one-half what they used to pay.

The President—Can you tell us about how much foreign pitch is being imported at the present time; at what rate it is being imported?

Mr. Watt—I noted the result of the imports a few weeks ago, and something like 3,000 barrels came in in one week. The amount of tar produced in the United States is not equal to the demand. The demand was estimated some three years ago as being at least 60 per cent.—50 to 60 per cent.—greater than the output of coal tar, although there are other products which they have utilized and brought into the market as substitutes. Now this water gas tar is similar to that used in Chicago. It is used for pouring on pavements and also for roofing purposes. It does fairly well. It is a very fair substitute, although not as good as genuine coal tar. Then they have pine products (wood tar), that the market is literally flooded with once in a while. Last year the prevailing prices of pitch were from $15 to $16 a ton. An inferior quality was sold as low as $14, and some as low as $13, and even less. This season, I understand, some of the lowest prices that have been quoted for first-class straight run pitch is about $14.50 a ton.

A Member—Do you know what the foreign pitch brings here?

Mr. Watt—I understand they have brought foreign pitch in as low as $12.50 a ton.

The President—Laid down on the seaboard?

Mr. Watt—Yes. One of the troubles about foreign pitch heretofore was that they bought one article and another was shipped. One New York party, who went over a year or two ago, bought foreign pitch and took orders all over the country; when the stuff came along it was not what he bought, and was held for freight in many cases.

A Member—A gentleman told me to-day that he was buying Scotch pitch, delivered anywhere he had a job, at $13 a ton.

Mr. Watt—Possibly along the Lakes he could get it delivered at that price.

A Member—He said he could get it all over the country.

Mr. Watt—Well, I could not do it.

A Member—I asked if it was as good pitch as ours, and he said that the city engineers accepted it usually, and it was just as good for him.

Mr. Watt—Of course, but frequently they will buy one class of pitch and receive another.

Mr. Holmes—I would like to inquire whether very much bye-product, in addition to the pitch, is secured from the distilling of the tar? I infer from what has been said that it will take about 5 barrels of tar to make a ton of pitch—that is, there is something like 35 per cent. deterioration in it; and it strikes me that this is overestimated unless there is some bye-product to realize upon.

Mr. Watt—The bye-products are the light and dead oils. The dead oil is not worth quite as much as the tar. The price of dead oil has been demoralized somewhat owing to the amount that has been imported, of a poorer quality than could be produced from the tar in this country.

The President—This dead oil is worth less per gallon than tar?

Mr. Watt—Yes, sir. The lampblack manufacturers use it largely for producing different kinds of blacking.

The President—Is it valuable for fuel?

Mr. Watt—Yes, it can be used for that. It produces a stronger heat if used as fuel; it is better and stronger than Lima oil. One barrel of dead oil for fuel purposes will go as far as at least 15 per cent. more Lima oil.

Mr. Gwynn—Did I understand it would cost about $1.60 per ton to distill it?

Mr. Watt—About $1.40, or 7 cents per cwt.

Mr. Gwynn—Then it would not be possible for you to pay 4½ cents a gallon at the still, at the present price, taking a waste of 40 per cent. in the manufacture of electric light carbons. It would take 311 gallons of tar to produce a ton of pitch, which, at 4½ cents a gallon, would be $14, and $1.50 per ton for distilling would be $15.50; and it is selling now as low as $16 or $17 a ton, delivered. Electric light carbon is being bought as low as $17. I got the quotations yesterday from two reliable sources, who told me their prices were $17, delivered at their door.

The President—Was that foreign or home-made pitch?

Mr. Gwynn—Home made. Now, at 4½ cents a gallon, it would bring the tar up to $14 a ton, and $1.50 manufacturing would be $15.50, and you could hardly produce and deliver it for $17.

Mr. Watt—Well, the possibility is that the tar is not distilled to what would be called a carbon pitch. As I understand it, carbon pitch should not stick to the mouth or the fingers at 105°.

Mr. Gwynn—I don't know what test they apply, but a sample I had some time ago was almost as hard as glass; you could break it like glass. They have tried to grind it. That grade of pitch, I was informed could be bought yesterday at $17, delivered at the factory.

Mr. Watt—Some of them get a softer pitch and boil it down to suit themselves. I do not know whether they are doing that now, but some of them formerly did it.

Mr. Gwynn—I don't think they are doing it now. In fact, it is tar of same quality as the sample there—the same as that shipped in barrels. I know they break the barrels off of it.

Mr. Watt—The pitch used for carbons is one of the smallest items among the large consumers.

Mr. Gwynn—That is true, but the various grades of pitch, other than that manufactured for electric light carbon, sell for lower prices. That is the highest price, I am informed, and you can buy it for paving for a less price.

Mr. Watt—You can buy a good quality of paving pitch at $14 to $15 per ton.

Mr. Gwynn—Then at that price there would be no money to the distiller in paying $2.50 per barrel for his tar.

Mr. Watt—He would have to get something for his by-products.

Mr. Gwynn—I understand those are so low the manufacturers are about ready to allow them to run into the gutter.

Mr. Watt—I sold 3,000 barrels last summer.

Mr. Gwynn—At what price?

Mr. Watt—Three cents a gallon.

Mr. Gwynn—At one time, when I asked about it, they offered it to me at 1½ cents a gallon. Thinking the price was low, I took the trouble to investigate it, and found that parties who had been using it could get all they wanted at a cent a gallon, and that they would not pay to exceed 1 cent a gallon.

Mr. Miller—At a cent a gallon, if it is as good as Lima oil, and Mr. Watt said it was better, it would be cheaper than coal at $1.50 per ton. That would make a pretty good fuel.

Mr. Gwynn—When I asked about the dead oil, they informed me they were using it under the boilers for fuel and they could not sell it.

Mr. Watt—The only trouble about that is creating paraffine in the pipes. That could be remedied, however, by putting one pipe inside of another. Now, I have burned dead oil, and it is far preferable to Lima oil for heating purposes.

The President—It seems to me that until tar shall have reached its fuel value on the market, the bulk of it is bound to be sold in the form of pitch. The gas companies run no risk in converting it into pitch, and the prospect of realizing upon it the largest amount of money is just as good when tar prices are low, or pitch prices low, as when they are high. The same ratio, it seems to me, will hold. I think we run no risk in converting it into pitch.

Mr. Watt—The tar that goes into tar paper ought to net about 7½ cents a gallon.

A Member—Is the paper sold by the pound?

Mr. Watt—Yes, sir; figuring a very low estimate on tar felt, after all expenses have been taken out, it would net you about 7 cents a gallon for your tar.

On motion of Mr. Shelton, a vote of thanks was passed to Mr. Watt.

Mr. Cline—I see by the programme that this is the last paper we are to have to day. Would it not be well for us to take up another paper, thus leaving less work to-morrow? It is early yet, and if it meets with the approval of the Association, I move we have Mr. Boyle's paper next, unless you have something else.

The President—I think Mr. Cline's suggestion is a good one, that inasmuch as it is rather early, we continue our session a while longer and dispose of some of our business this afternoon. I have here a very interesting and valuable letter, with some reports, from Mr. A. C. Humphreys. I think it is self explanatory. It is on the subject of Municipal Control of Gas Works, and if it is the wish of the Association we will ask the Secretary to read it.

MUNICIPAL CONTROL OF GAS WORKS.

PHILADELPHIA, PA., March 19th, 1894.

MR. IRVIN BUTTERWORTH, President Ohio Gas Light Association, Columbus, O.

My Dear Sir—Since writing to you to say that I was obliged, by force of circumstances, to forego the pleasure of being present at this meeting of your Association, I find myself in a position to give you a most interesting letter from my friend, Herr von Oechelhaeuser, head of the German-Continental Gas Company, a Company controlling and operating many gas works spread over the Continent of Europe, and with headquarters at Dessau, Germany.

This letter is upon a subject so important to gas interests that it occurs to me that your Association may be glad to lay it before its members.

The Philadelphia *Ledger*, which, as you probably know, has the reputation of being careful as to collection of facts before putting itself on record, and especially so as to its editorial columns, came out in an editorial article, in its issue of Dec. 7th last, to the effect that the results obtained in Germany, and more especially in Berlin, pointed to the fact that everything there was steadily drifting towards municipal control, and that such municipal control gave the best results.

Herr von Oechelhaeuser being a personal friend of mine, and knowing that he was probably the best posted man in Germany on this subject, I inclosed the article to him, and asked him if he would kindly, at his leisure, give me a reply, and in such shape that I would be at liberty to use it if I thought it desirable.

The reply, as I have stated, has just come to hand, and as it gives such important information on such a vital subject, I feel that I must at least pleasurably take time to properly place the facts before you, for use at the coming meeting, if you deem such course proper and desirable.

I inclose a copy of the *Ledger* editorial and copy of Herr von Oechelhauser's reply to my inquiry as to the facts.

[From editorial columns Philadelphia *Ledger*, Dec. 7th, 1893.]

"That the municipal ownership of gas works is good public policy and defensible upon sound business principles is abundantly verified by German experience. In 1847 Berlin commenced to manufacture gas, and has since gradually acquired possession of all the works which had been conducted by private corporations. These works have been very profitable.

"Twenty-nine of the 44 largest cities in Germany now have their own gas works. The wages paid are very nearly the same as those paid in the best private works.

"On several occasions the surplus income of these municipal gas works has contributed large sums to make up the deficits in the other city departments."

[Herr von Oechelhaeuser's reply.]

DEUTSCHE CONTINENTAL GAS GESELLSCHAFT IN DESSAU,
DESSAU, January 27th, 1894.

MR. ALEX. C. HUMPHREYS, Gen. Supt. United Gas Improvement Co., Philadelphia, U. S. A., Drexel Building:

My Dear Sir—Referring to your kind letter of Dec. 7th, 1893, I think the following communications will satisfy you; any use you may make thereof has my approbation.

The Philadelphia *Ledger*, saying in an editorial in its issue of Dec. 7th, 1893, that in Berlin all the gas works are owned and controlled by the municipality, is wrong. The city of Berlin is supplied with gas not only by municipal works, but also by several works belonging to the Imperial Continental Gas Association. From these works nearly 28 per cent. of the whole supply is delivered. The suburban districts are now, and will be for a long time, exclusively supplied with gas by the Imp. Cont. Gas. Assoc. Hence it follows that with the growth and extension of the German capital, the output of the private gas works will much more increase than that of the municipal gas works.

In Leipsic a great part of the city and the most of the suburbs are supplied by the Thuringische Gas Company, the prospects for future development being the same as in Berlin

In the following great cities of Germany there are private gas works: Aachen, Altona, Augsburg, Bamberg, Crefeld, Dortmund, Erfurt, Francfort-on-the-Main, Hannover, Munich, Regensburg, Stuttgart, Trier, Metz, Erlangen, Esslingen, and others. In the neighboring States, Amsterdam, Brussels, Graz, Luxemberg, Rotterdam, Salzburg, Vienna, Warschau, etc., have private gas works.

Political influences do not enter into the management of municipal gas works in Germany. Positions in gas works, as the refuge for henchmen of the political "boss," are entirely unknown in this country.

From a consumer's standpoint private ownership of gas works is certainly preferable, for, as a rule, prices are lower where a company supplies gas, and in most cases more facilities for house installations are given. Every consumer of a private gas works can be, and is, treated *individually* in gas installation, in hiring gas engines, gas stoves and other gas appliances. On the other hand a municipal gas works has only one scheme for everybody. It happens often that the town councils decline a proposed lowering of gas prices, for general or special purposes, because they fear to diminish the surplus income. Private gas works are generally more economically built and administered, and their managers, independent of town councils, can more easily provide their works with the newest and best apparatus, and sell the bye-products and buy the coals at better prices.

In a paper on "Power Supply from Gas Works," just prepared for publication, Mr. Chaefer, bibliothecary of the German Continental Gas Company, after careful investigation, and backed by abundant statistical data, has stated that, as a rule, under private gas works ownership, gas engines are much more in use than under municipal control, better "pushing" of gas engines by private managers and lower prices for power gas being the causes. For instance, the district supplied by the *municipal* gas works of Berlin has 1,600,000 inhabitants, and not over 1,200 gas engines, or one to every 1,300 people. Koenigsberg (municipal) has one gas engine to every 3,600 inhabitants. Dantzic (also municipal), one to every 2,400, and so on. In Hannover, however, where the gas works is owned by the Imp. Cont. Gas Association, and in Gotha and Erfurt (German Continental Gas Company), Stuttgart (private ownership), one finds in use one gas engine to every 600–700 people. In many smaller towns still better proportions are stated; two places in Saxony, supplied by the New Gas Company (Nolte) of Berlin, having the best results, viz., one gas engine to *every* 200 *people*.

The recent development of electrical stations in Germany seems also to favor private control, after many bad results of municipal electrical works, so that a few weeks ago the famous and long quarrel about the erecting of a big electrical central station in Francfort on-Main, ended with the resolution of the municipality to build their own works, but to *transfer the management for a longer time to the contractors*. In the same way Leipsic and some other important towns will be supplied with current from central stations owned by the towns but *controlled by private enterprisers*. This may be considered as a partial reversion from the principle of municipal policy.

Hoping that the data as given above is at least in some degree sufficient for your purpose, I remain, with my kindest regards,

Yours very truly, (Signed) V. OECHELHAEUSER.

On the other side of the water it would not be necessary for me to say a word about the writer of this letter of denial, as his reputation is such that no indorsement would be required, and certainly no indorsement from me. As, however, my associates on this side may not be so well acquainted with Herr von Oechelhaeuser as I am, I would state that he, as manager of all these continental gas companies, goes into the minutest details of all branches of his business, travels a great deal through Europe, goes over to England to examine closely what is going on there, and it was during one of his trips there that I first made his acquaintance. He spent last summer in this country, and was, to my knowledge, a most careful investigator.

These statements coming, therefore, from a man so well informed and so fair minded, make a very satisfactory denial of the statements made by the *Ledger*, which no doubt are based upon the statements made by certain professors of political economy, who seem sometimes too ready to rush into print on subjects which they have not completely studied.

From Herr von Oechelhauser's reply we see that municipal control in Germany does not give the satisfactory results claimed for it by some of its advocates in this country, and this in spite of the fact that in Germany politics, as we understand the word, does not enter into municipal management. A fair investigation would prove that in Great Britain also the results obtained by municipal management of gas works do not compare favorably with the results obtained from private management; and this also in spite of the fact that to no such degree as in the United States does the influence of politics enter into municipal affairs. For instance, to speak of a well known case, in Glasgow the Chairman of the Gas Committee and the Chief Engineer are widely opposed to each other in politics. But when I expressed my surprise at such being the case, and that they could be working so harmoniously and efficiently together in the one city undertaking, they, in turn, expressed surprise that I should think there was any connection between politics and municipal undertakings. But apart from politics, why have we any right to expect as good results from municipal management as from private? What is there in human nature to warrant us in such a belief? The private concern, working for its own gain, will practice economies, and to that end improve its methods, far beyond what will be the case with municipal management, with its lack of the same incentive.

I know the professors, arguing on the other side, will claim that this same selfishness in the human character will lead to unjust charges and unfair treatment of consumers, in the case of private ownership, but there are many other elements which enter into and fairly well control this question in the interest of the public. One point, not of the least importance, is that this same human selfishness is nowadays demonstrating to the modern business man that he cannot afford to abuse the business privileges granted to him. It seems to me most unfortunate that where there is so much room for reform and improvement in our political and public world, that all of us who are interested in such improvement and willing to work therefor, cannot better combine our forces. But the fact is, while the abuses still exist and in some quarters are even increasing, the men who should be waging war unitedly against such a state of affairs are divided against themselves. For instance, these same advocates of municipal control of gas works seem to me to consider the subject only as schoolmen, and forget that for true effect there must be harmony of theory and practice. We cannot theorize as to what would be a desirable form of management in case this world were a very different and very much better place than it is, but we must, in establishing our theory, bear all sides of the question in mind, and not lose sight of the weakness of the human character. To do otherwise would be like designing for the rough and dirty work of the retort house a finely finished engine, equipped for all the refinements of modern best practice, as applicable to high class work. The fine engine, perfect though it may be for a different line of work, and amid different surroundings, is totally unfitted for the heavy, crude work, rough usage and dirty surroundings of the retort house. Another thing which has led to error in the discussion of this question is that the professors referred to (with all due respect) have not been competent to investigate and compare the results obtained from different kinds of gas management. And this is no impeachment of their intelligence. Those of us who have had occasion to make such comparisons in detail know that conclusions cannot be jumped at from a consideration of the surface facts. It needs a thorough knowledge of the gas business to be able to fairly weigh the evidence in full.

For instance, the city of Wheeling, under municipal control of its gas works, sells its gas for 75 cents per 1,000 cubic feet, and this in spite of a not very large output. A surface consideration of the facts seems to warrant the assumption then that Wheeling is selling its gas at a very low price because of municipal control. But a little competent analysis and comparison soon demonstrates that the low price at Wheeling is only possible because of its geographical position, and also that the ability to sell 75 cent gas in Wheeling is not as creditable to the Wheeling management as is the selling of $1.50 gas at other points not so well located.

I do not wish to be understood as underrating the ability or the candor of the writers on the other side, but knowing, as I do, of the errors they have fallen into, absolutely absurd in some cases, I wish to make the point that they must demonstrate their ability to fairly discuss *this* question, and not expect us to accord them infallibility because of previous reputation made in other fields. I am the last one to slight or despise the work of the schoolmen. I am the son of a man who spent his whole life, and successfully, in such work, and I am interested in the management of one fairly prominent institution of learning, but I also bear in mind that we are all apt to be one-sided, and *the* weakness of the schoolmen in that direction is their liability to forget, or, at least, partially forget, the *controlling* weaknesses of human nature. It is useless for us to build up any scheme, no matter how beautiful it may be as a scheme, if the inherent weakness and the environment of the agents we of necessity must select for the execution of the scheme, will prevent them from living up fully to the scheme made for them. Better modify the scheme in the first place, and establish only such a one as can be honestly and completely lived up to.

Now, what in the United States are the weaknesses of a scheme of municipal control, beyond the weaknesses referred to as affecting such management in Europe? Let us not blink the facts; that will not improve them or make them easier of digestion. Municipal control in the United States, *under the conditions now prevailing*, is inseparably wedded to machine politics and the "boss" system.

If, then, the writers on the other side are honest as reformers, why do they wish to put this additional weapon in the hands of the party "boss?" They must, or should, know that under the same conditions, to give these men this additional control means additional corruption. Experience in the United States, if investigated by honest and competent persons, will show that many a gas company would have been ruined financially if managed as most of these municipal gas undertakings have been.

It seems to be the idea with many of these professed reformers, that it is simply a question of selection of the right men. I say that we must go deeper. Do we not see that time after time reform movements fail because the men trusted to make the reform effective, have only demonstrated under test that they, like others, were humanly weak? We must go deeper and reform the lines of government, and further, the very fountain of the human heart, before we can put into practice some of the alluring, but unpractical schemes of reform worked out for us in the closet of the schoolmen. Better to effectively reform along lines possible than to strive unsuccessfully for the unattainable perfect.

While human nature is as it is, and especially while the United States municipalities are governed as they are, I unhesitatingly affirm that municipal management of business enterprises will not favorably compare with the management under private control. And I have had the opportunities, and perhaps unusual opportunities, to observe and compare the results in both cases.

Let us, instead of adding to the temptations surrounding our public servants, so limit and confine them, as to make it easier for them at one and the same time to be public servants and also honest men.

Very truly yours, ALEX. C. HUMPHREYS.

The President—I am sure the Association will agree with me that the correspondence submitted by Mr. Humphreys is a very valuable addition to the literature which every gas man should have at hand on this subject. I think a vote of thanks should be tendered Mr. Humphreys for writing this paper and furnishing us this data.

Mr. Cline—I move a vote of thanks be tendered to Mr. Humphreys for this paper.

The motion being seconded, unanimously prevailed.

The President—Possibly some of the gentlemen would like to say something on this subject now; if so, I will give them an opportunity. If not, I will now appoint a Committee on Next Place of Meeting. I will name as Chairman of that Committee Mr. Jerome Penn; the other two members will be Geo. H. Tayler, of Warren, and G. A. Allen, of Zanesville. That Committee can report to-morrow.

On motion of Mr. Gwynn, the Association adjourned until Thursday, March 22d, at 9 o'clock, A. M.

(To be continued.)

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. G. W. BENEDICT, writing to the JOURNAL, from Liberty, Ind., under date of March 28th, says: "How is this? In our search for an owner of oil wells, so as to become possessors of our own oil, to be extensively used by our system, I encountered a gentleman who is probably going to be a formidable competitor in the gas business. Mr. B. F. Fulton has invented an electrical appliance 'as accurate in the find of either natural gas or oil, as the compass is to point toward the North Pole,' so he says. He has made nine locations, eight for gas and one for oil, and every one was a great success. A gentleman told me that he and others had erected a derrick, placed their boiler and got ready to bore for gas. Just then Mr. Fulton came along with his machine, and, after testing the spot, declared for a 'dry hole,' but informed the parties if they would 'move over' to where he had driven a stick, about 15 rods distant, they would obtain a gusher. They thought Fulton was cranky and went on boring the 'dry hole' to a depth of 1,200 feet, after which they went over to Fulton's stick, and at a depth of 1,175 feet got a fine flow of gas. Fulton, with a company of Richmond, Ind., men, are boring at that place, are 1,050 feet down, and, of course, expect to get a good gusher. We consider Richmond outside the gas belt—geologists do also, but Mr. Fulton says the gas belt reaches South to central Georgia. We have contracted with Mr. Fulton to find gas at Hamilton, Ohio. If he desired other men to furnish the capital and pay him $1,000 for boring a well, it might look suspicious, but he agrees to find either gas or oil where his 'machine' says it exists on guarantee, and no money is paid until the article in paying quantity is found. I will inform your readers what becomes of this gas wizard and his electrical appliance."

THE proprietors of the Consumers Gas Company, of Reading, Pa., have agreed to reduce the net selling rate to $1.60 per 1,000 cubic feet.

MR. WILLIAM A. ARMINGTON, formerly Superintendent of the Flatbush (L. I.) Gas Company, has been appointed General Superintendent of the American Light and Fuel Company, of this city.

A QUEER resolution was recently adopted by the City Council, of Camden, N. J., under which the Camden Gas Light Company is directed to hereafter render a separate bill for each public street lamp maintained by it under contract with the city.

THE slow-going owners of the Mount Holly (N. J.) Gas Company have at last got to the point of calling the attention of their consumers to the advantages of Welsbach burners, and so on. If the Company would only reduce the gas rate and lay a few more miles of mains, it could easily increase its output at least 40 per cent. The service rendered by the local electric concern, however, is wretched.

AT the annual election of the Gettysburg (Pa.) Gas Company, the following officers were chosen: Ed. McPherson, W. T. Ziegler, George J. Benner, C. S. Duncan, L. M. Buehler and J. M. Walter; President, Edward McPherson.

AN Indianapolis, Ind., correspondent says: "Last March Messrs. S. P. Sheerin, DeWitt C. Justice and ex-Judge Nelson, representing the Logansport Natural Gas Company, had a consultation with Miller, Winter & Elam, attorneys, in reference to the Logansport natural gas case, which is in the Supreme Court. In this case, which has been carried to the highest court from Logansport, is involved practically the same question that was recently raised in Indianapolis. The contention of the Gas Company is that it has the right to fix a sliding scale of prices, notwithstanding the provision of the city ordinance. Miller, Winter & Elam are the attorneys for the Indianapolis Natural Gas Company. An effort will be made to obtain from the Supreme Court a decision that will settle the questions in controversy in all the cities of the State. The constitutionality of an ordinance fixing specific rates to consumers will be tested."

WE are informed that the Spring City Gas Company, of Royersford, Pa., has been leased to Mr. J. L. Kaler, of Phoenixville, Pa., for a term of five years.

THE Council, of Liberty, Ind., on the 26th of March, contracted with the local Gas Company to light 60 public lamps, until 11 P. M., moon light schedule, on the basis of a payment of $12 per lamp per annum. The contract is to last for four years.

THE authorities of Clinton, Iowa, have entered into a contract with the Clinton Gas Light and Coke Company—which is also the successor to the Clinton Thomson-Houston Electric Company—under which the Company is to maintain 100 arc lamps (2,000 candle power nominal), on a dusk to daylight table, save when the moon is full and unclouded, at the rate of $90 per lamp per annum, The contract is to run for 12 years, and the city has the right at any future time to order additional lamps, as the welfare of the residents seems to require.

MR. M. W. MORRIS, President of the proposed Nanticoke (Pa.) Gas Company, has filed with the Borough Council an acceptance of the ordinance under which it is to operate. The contract for the buildings has been let, and the plant is to have a per diem capacity of 150,000 cubic feet.

MR IRVING HOWBERT, Receiver of the Colorado Springs, Col., Lowe Gas and Electric Light Company, notifies us that all unsecured creditors of the Company should submit their claims with proof of same to him at his office in Colorado Springs, on or before April 20th.

THE proprietors of the Adams (Mass.) Gas Light Company have passed a resolution reducing the gross selling rate to $2.50 from $3 per 1,000 cubic feet, the usual discount of 20 per cent. for prompt payment to rule as before. The concession dates from April 1st.

A HEARING was given on the morning of March 30th by the Board of Gas and Electric Light Commissioners, at their office, No. 13 Beacon street, Boston, on the application of F. A. Keazer and others, customers of the Jamaica Plain Gas Light Company, complaining of low candle power and high price of gas furnished by the Company, and petitioning for an order for an improvement in quality and reduction in price of gas. Colonel John T. Wheelwright presided. A letter was read from H. M. Cross, representing the petitioners, stating that the Company, having made a reduction of 20 cents per 1,000, and that another reduction is promised, he thought that under the present condition of affairs the interests of petitioners are safe in the hands of the Board without the interference of the petitioners. The Chairman said that as the complaints of the petitioners are matters of record, and in which the public are interested, he thought the hearing should go on, and that the Company should make some answer to the charges that have been made in the petition. Mr. C. P. Greenough, Counsel for the Company, said that in July next it is proposed to make a further reduction in the price to $1.65 per 1,000 feet, which is all that it should do at the present time. It would not be safe to reduce the price to a merely living price in view of the fact that electricity for street lighting purposes is liable to be introduced into Jamaica Plain. The Company would be glad that the Board examine its business with a view to fixing the price; for he felt that it would be perfectly safe in the hands of the Board. Mr. E. H. Yorke, Engineer of the Company, was called by the Board and asked to explain the statement in its report to the Commissioners that for three years it had been reported that the Company had on hand 1,600 tons of coal more than was actually on hand. He said he was not Engineer of the Company at that time, and he supposed the mistake resulted from the difficulty in estimating without weighing the amount of coal in the bins. He could not give the exact weight of coal on hand now, although he knew it was quite low. The largest quantity the Company had on hand at any one time did not exceed 2,500 tons. Commissioner Schaffner here remarked that even at the maximum, a shortage of 1,600 tons ought to be sufficiently observable and call for an investigation. Mr. Greenough, when asked if the Company had not declared an unusually large dividend this year, replied that the usual dividend of 10 per cent. had been declared. He also remarked that on a certain 10½ miles

of its mains the Company had only seven consumers per mile. The case was taken under advisement.

THE gas plant at Rockaway Beach, L. I., will be in working order this summer. It was constructed under the supervision of Mr. George Sipe, of Hagerstown, Md.

THE Springfield (Mass.) *Republican*, of March 31, says: "The Mutual Gas Light Company, of West Springfield, Mass., for which George Olney, of New York, secured a charter last September, was not incorporated until March 10th last. According to the record at Boston the capital stock is $100,000 divided into 1,000 shares of the par value of $100 each. The list of Directors submitted is, William Murdock, President; James B. Olney, Treasurer; and J. L. Douglas, Secretary. Presumably all the officers are New York speculators. The franchise to dig up the present and future West Springfield streets was granted without a hearing to a man who represented no organized Company. A stipulation was made, however, that the proposed Gas Company must begin the distribution of gas before the expiration of a year from January 1, 1894. The remarkable franchise was granted September 19, and on December 19 the privilege was mortgaged by George Olney to Richard Irvin to secure debts amounting to about $2,000. So far as can be learned not a West Springfield man is directly interested in the mysterious Company, and letters constantly being received for it at the post office are unclaimed."

AT the annual meeting of the Brush Electric Company, of Cleveland, Ohio, the following officers were chosen: President, W. H. Lawrence; First Vice-President, C. A. Coffin; Second Vice-President, S. M. Hammill; Treasurer, B. F. Miles; General Counsel, W. B. Bolton; Secretary, A. B. Hough—all re-elections, save in the instance of the Second Vice President.

THE Economical Gas Apparatus Construction Company, of Toronto, Can., which is just completing the first year of its existence, reports no dull times. During the past year it has been granted patents in the United States, England and Canada, with other important ones now pending, and has placed in the named companies improved Lowe water gas apparatus of the Merrifield-Westcott-Pearson type: One set for the Ottawa Gas Company; one set for the Consumers Gas Company, of Montreal; remodeled the works of the Consumers Gas Company, of Lindsay, and placed its improvements on four "Standard Lowe" water gas sets. The Company is now building a new works at Kingston, Pa., including the water gas apparatus, purifiers and holder. The sets are giving the utmost satisfaction, the contractors not having received complaints from companies using them. In this form of setting every detail has been considered.

THE proprietors of the Cottage City (Mass.) Gas Company have bought the Corbin building on Montgomery Square, Cottage City, and are fitting the same for their office purposes.

WE regret to announce the death, on the night of April 1st, of Mr. George A. Halsey, a Director in the Citizens Gas Company, of Newark, N. J. Deceased, who was prominent in the commerce, politics and social life of New Jersey, was in his 66th year. The cause of his death was pneumonia.

THE earnings of the Toledo natural gas plant, which is operated by the municipality of Toledo, Ohio, for the last quarter are returned at $15,000. The General Manager, Mr. Wm. P. Heeston, speaking of the standing of the plant, said: "The outstanding indebtedness reaches $1,000,000, drawing 4 per cent. interest. The city owns altogether 165 miles of pipe—73 miles outside the city and 92 miles within. Moreover, the city owns a telephone line of 51 miles, 5,435 acres of land with 85 wells in, and pumping stations at Van Buren and Dunbridge, valued at $45,000."

THE Directors of the Phœnix Gas Light and Fuel Company, of Phœnixville, Pa., have purchased the plot known as the Bonner tract, in the northern district of the borough, and will erect thereon a new gas plant.

MR. S. C. THOMPSON, representing the National Light and Fuel Company, appeared some days ago before the Congressional Committee on the District of Columbia, with a bill asking for the right to supply gas and electric lights in the city of Washington. The bill submitted fixes the capital stock of the Company at $1,000,000, with the power to issue bonds for the same amount. Forty per cent. of the stock is reserved to be taken by residents of the District of Columbia, if they choose to subscribe for it within five days after the books of the Company are opened. The bill authorizes the Company to lay pipes, mains, etc., in any and all of the streets of Washington, and to erect suitable buildings and works. Other corporations are not excluded from the rights granted this Company, and before exercising any of its rights the Company is required to file a bond with the District Commissioners for $100,000 as surety that it will not sell its franchise or consolidate with any other gas company. A further bond is required in the sum of $50,000 to repair any injury to roadways or streets in the District caused by extending its mains, and the Company is required to commence the erection of its works within six months from the passage of the bill. The incorporators are: John M. Harriman, Theodore F. Hicks, Richard M. Jordan, Fred. W. Kappenback, Robert J. Ferns, Frank G. Hallett and Wm. R. Knapp, of New York, and Samuel C. Thompson, of New Jersey.

THE Boston, Mass., Gas Light Company looks coldly on the proposition to introduce the prepayment gas meter, the main objection seeming to be the increased cost over the ordinary meter.

MR. W. L. DECHANT, Vice-President of the Merchants National Bank, of Middletown, Ohio, has been appointed Receiver of the Middletown Gas and Electric Illuminating Company. The liabilities are about $200,000.

WE are indebted to Mr. G. T. Thompson, of St. Louis, for the information that the authorities of that city are about to make an investigation, with a view to tracing the responsibility and ultimately to prevent a recurrence of the trouble concerning damage that had been done to the city's system of water mains by the vagrant electric currents which have unpleasantly manifested themselves since the introduction by the St. Louis and Suburban Railroad Company of the electric system of propulsion. The most notable case of damage so far reported was in a 6 inch water main, which developed a pronounced leak at the point of intersection of Hodiamont and Maple avenues, a location not far from the power-house of the Railroad Company, and there is little doubt that the Railroad Company is the offender. Pieces of the pipe which were returned to the office of the Water Commissioner, were found to be completely honeycombed. The Water Commissioner (Mr. M. L. Holman) has addressed a sharp letter to the Company, in which the Commissioner declares that as the water pipe system is being endangered by the faulty return system of the Company, the city will hold the offender responsible for damage accrued and accruing. In the meantime, Mr. Andrew J. O'Reilly, Supervisor of City Lighting, has been granted an appropriation to be devoted to securing the necessary apparatus for detecting the presence of stray currents in the earth. Mr. Thompson is also our authority for the statement that, although the city has only moved in the premises within the past fortnight, it is, nevertheless, a fact that these currents have been affecting gas and water services for at least a year.

IT is reported that the Montreal Gas Company proposes to increase its capital in the sum of $500,000.

AT an executive session of the Board of Directors of the Troy (N. Y.) Gas Company, held on the morning of the 2d inst., a resolution was adopted reducing the selling rate to $1.70 per 1,000 cubic feet.

THE report submitted by the Special Committee of Select Councils of Philadelphia, appointed to investigate the "physical condition" of the city's gas works, is a scathing arraignment of the system. They found that the sum of $1,878,000 would have to be expended to put the plants in good working condition; also, that while the nominal daily producing capacity of all the plants owned by the city is 18,000,000 cubic feet, the wretched state of the same is such that not over 6,000,000 cubic feet can be produced. In summing up the Committee concludes there are three courses open: First, to expend $1,000,000 on the improvement of the present coal gas plant, and an additional $1,000,000 for the erection and equipment of the water gas plant at Point Breeze. Second, that the city should purchase from private makers all the gas it sells and uses. Third, either sell or lease the works. Under the last head the report says: "In an ideal government, where changes of administration are infrequent, and where successful methods once adopted can be continued and improved upon, State control of all these things affecting citizens generally will no doubt accomplish the greatest good to the greatest number; but in a government like ours, where changes come with quick succession, where new men and new methods speedily supplant the old, and none remain long enough to define a policy or introduce needed reforms, the application for a long period of time of business reforms, the application for a long period of time of business methods for the conduct of a permanent business enterprise is almost impossible. * * * For years and years we have been going in the same old groove. One head of a department comes in, looks over the works, detects their fauits, makes recommendations for reforms and improvements, and before anything is done he is succeeded by another, who does the same thing The system of book-keeping employed does not show the details of actual operation and condition of the works as to interest upon plant, wear and tear, etc., and no man can tell, except by estimate, the exact status of our gas account, but that it is unfavorable to the city is evidenced by the fact that after 50 years of what is supposed to be profitable management we find ourselves with antiquated works, requiring an expenditure of nearly $3,000,000 to make them presentable, and with half our gas franchise of manufacture in the hands of private parties without a dollar of actual outlay for procuring it."

THE estate of the defunct Metropolitan Gas Light Company, of Elizabeth, N. J., is again in the courts.

The Market for Gas Securities.

The market for Consolidated enjoyed an even keel during the week's trading, and the opening to day was made at 136¼, with the probability, however, that a reaction was not far off. At this time of writing (noon, Friday) the impression is that maximum figures on the present rise have been reached. The "Reform Assembly" is confessing to very hard times in Albany, and it is not at all unlikely that a determined effort will be made to get the rate bills out of committee. We do not apprehend, however, that the bills—or any one of them—will become laws this year. Other city shares are strong, notably Standard preferred, the regular quarterly dividend on which has been declared. Equitable is also in demand, but it looks to us to be at its maximum just now.

The Brooklyn situation remains mixed, particularly in respect of the intention or purpose of the managers of the Fulton-Municipal, whose construction of a distributing station in the Eastern Section certainly looks menacing. Prices, however, are fairly well maintained. Chicago gas is acting in its usual shuttlecocky fashion, although the range for the week was narrow. We think the shares are cheap and worth taking a speculative try at. Baltimore Consolidated is a trifle easier, mainly on account of realizing sales, but it is very cheap at 65–66. The wonder grows in respect of the rise in Consumers, of Jersey City, which is bid for at 37, and rumors are in the air of a possible dividend. Where the money to pay it is to come from is a puzzle. Montreal gas is a trifle weaker, as it naturally should be following the rather poor showing made by the Company for the past year, the evidence of which is found in the annual report recently submitted to the shareholders.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,

16 Wall St., New York City.

April 9.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share. ☜

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	136⅞	137
Central	500,000	50	100	—
" Scrip	220,000	—	100	--
Equitable	4,000,000	100	182	184
" Bonds	1,000,000	—	106	108
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	108	112
Mutual	3,500,000	100	145	150
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	80	95
" Bonds	150,000	—	—	100
Richmond Co., S. I.	348,650	50	50	—
" Bonds	100,000	—	—	—
Standard Gas Co—				
Common Stock	5,000,000	100	—	35
Preferred	5,000,000	100	75	80
Yonkers		50	112	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	108	110
Citizens	1,200,000	20	55	—
" S. F. Bonds	320,000	1000	—	101
Equity Gas Light Co	2,000,000	100	—	—
Bonds	1,000,000	—	—	—
Fulton Municipal	3,000,000	100	—	141
" Bonds	300,000		103	—
Peoples	1,000,000	10	—	80
" Bonds (7's)	368,000	—	100	—
" " (6's)	94,000	—	98	100
Metropolitan	870,000	100	140	—
" Bonds (5's)	70,000	—	100	—
Nassau	1,000,000	25	160	—
" Ctfs	700,000	1000	99	100
Williamsburgh	1,000,000	50	135	—
" Bonds	1,000,000	—	107	110
Out of Town Gas Companies.				
Bay State Gas Co.—				
Stock	5,000,000	50	22	23
Income Bonds	2,000,000	1000	60	—
Boston United Gas Co.—				
1st Series S.F. Trust	7,000,000	1000	78	—
2d " " "	3,000,000	1000	57	58
Buffalo Mutual, N. Y.	750,000	100	121	125
" Bonds	200,000	1000	95	100

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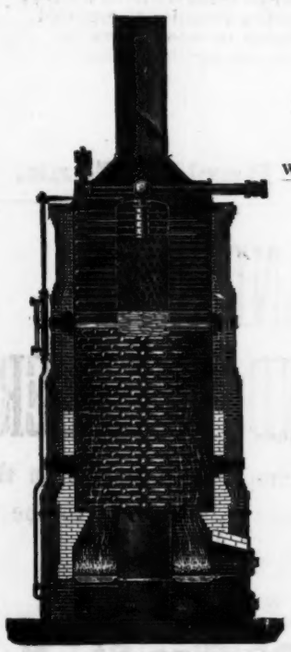

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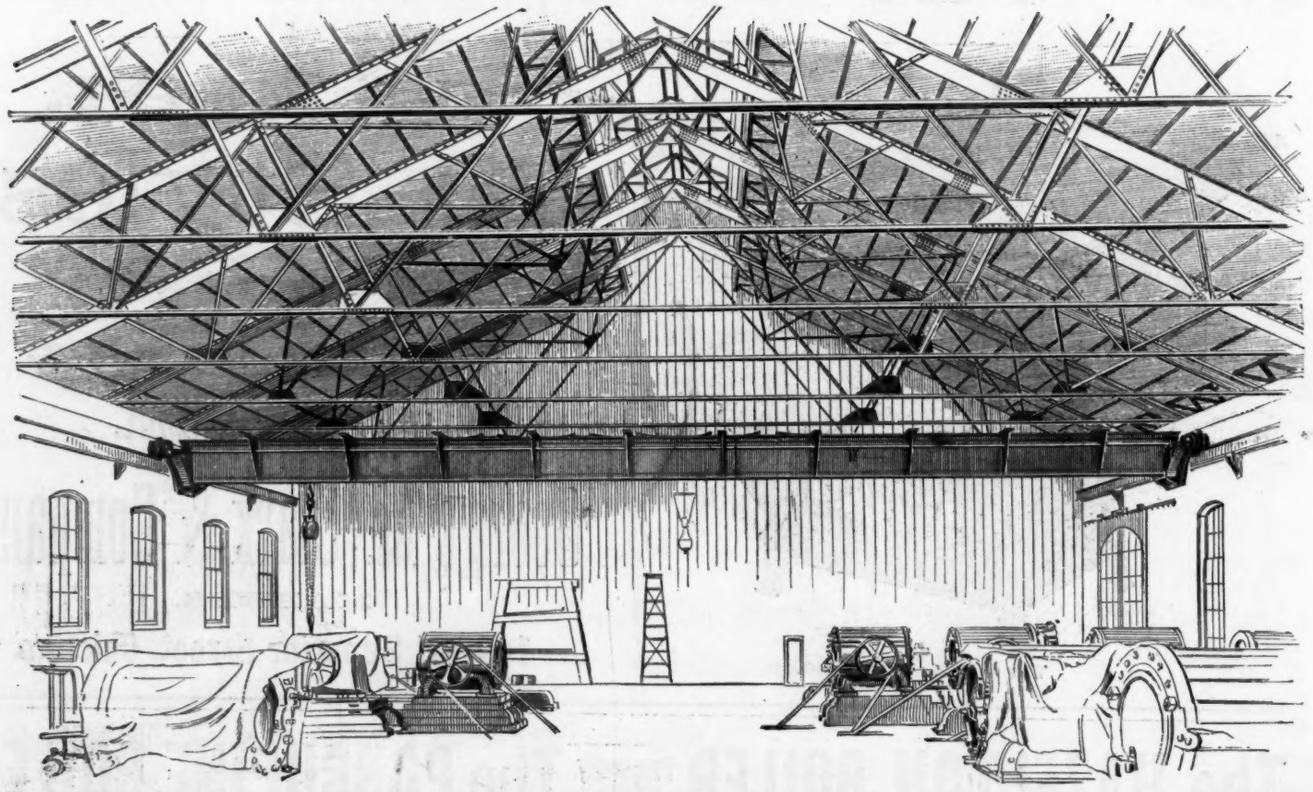

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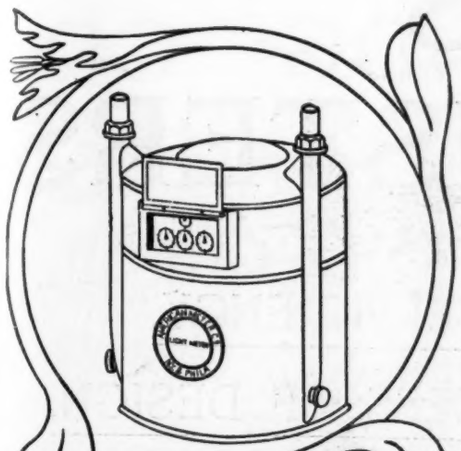

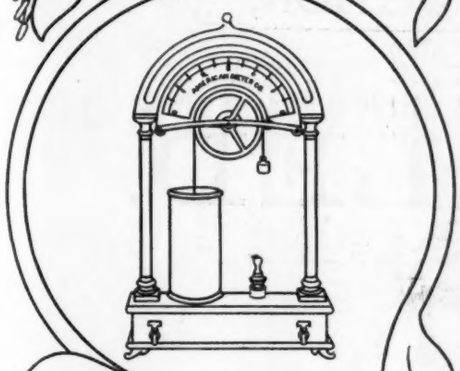

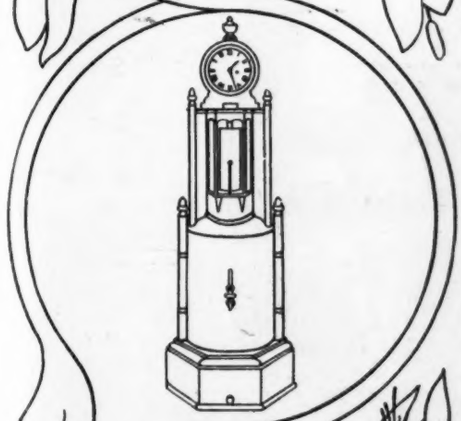

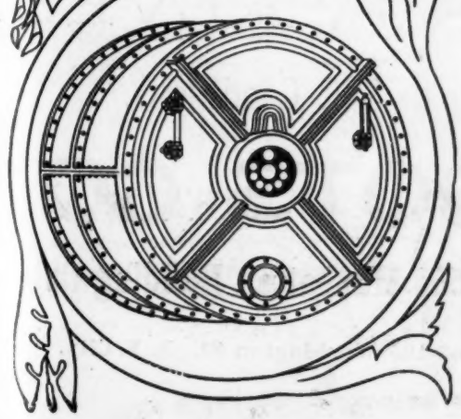

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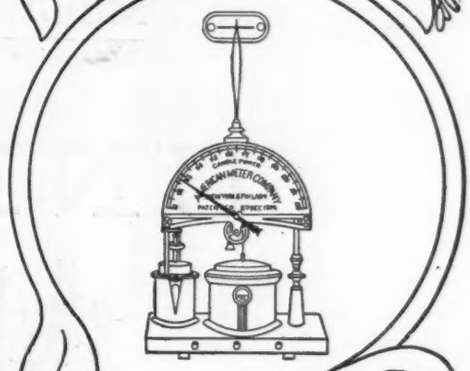
PUBLIC LIGHTING TABLE.

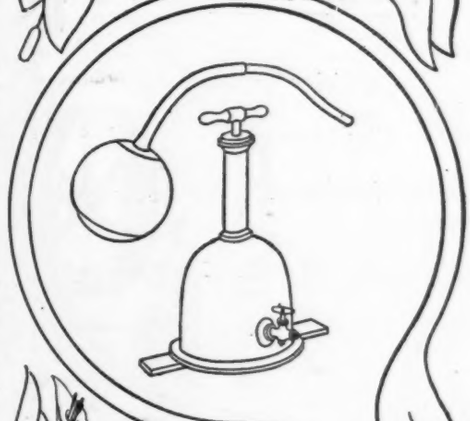
APRIL, 1894.

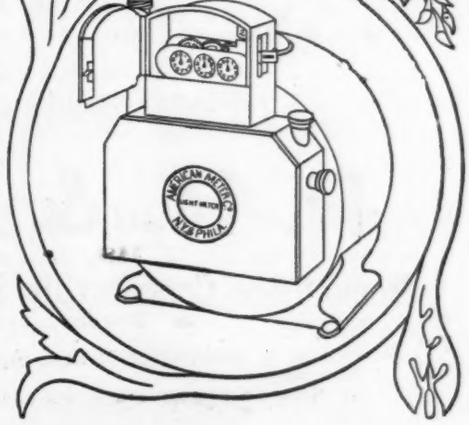
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Sun.	1	6.50 PM	4.40 AM	6.10	4.55
Mon.	2	6.50	4.40	6.15	4.40
Tue.	3	7.00	4.40	6.15	4.40
Wed.	4	7.00	4.40	6.15	4.40
Thu.	5	7.00 NM	4.40	6.15	4.40
Fri.	6	7.00	4.40	6.15	4.40
Sat.	7	7.00	4.30	6.15	4.40
Sun.	8	7.00	4.30	6.15	4.40
Mon.	9	7.00	4.30	6.25	4.30
Tue.	10	11.20	4.30	6.25	4.30
Wed.	11	12.20 AM	4.30	6.25	4.30
Thu.	12	1.10 FQ	4.30	6.25	4.30
Fri.	13	1.50	4.30	6.25	4.30
Sat.	14	2.20	4.20	6.25	4.30
Sun.	15	2.50	4.20	6.25	4.30
Mon.	16	3.10	4.20	6.30	4.20
Tue.	17	3.30	4.20	6.30	4.20
Wed.	18	No L.	No L.	6.30	4.20
Thu.	19	No L. FM	No L.	6.30	4.20
Fri.	20	No L.	No L.	6.30	4.20
Sat.	21	7.10 PM	9.50 PM	6.30	4.20
Sun.	22	7.10	10.50	6.30	4.20
Mon.	23	7.20	11.50	6.40	4.10
Tue.	24	7.20	12.50 AM	6.40	4.10
Wed.	25	7.20	1.30	6.40	4.10
Thu.	26	7.20	2.20	6.40	4.10
Fri.	27	7.20 LQ	2.50	6.40	4.10
Sat.	28	7.20	3.20	6.40	4.10
Sun.	29	7.20	3.40	6.40	4.10
Mon.	30	7.20	4.00	6.45	4.00

TOTAL HOURS LIGHTING DURING 1894.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	244.10	January	423.20
February	195.30	February	355.25
March	206.20	March	355.35
April	169.40	April	298.50
May	162.10	May	264.50
June	135.40	June	234.25
July	146.30	July	243.45
August	162.20	August	280.25
September	174.10	September	321.15
October	211.20	October	374.30
November	221.00	November	401.40
December	245.30	December	433.45
Total	2274.20	Total	3987.45







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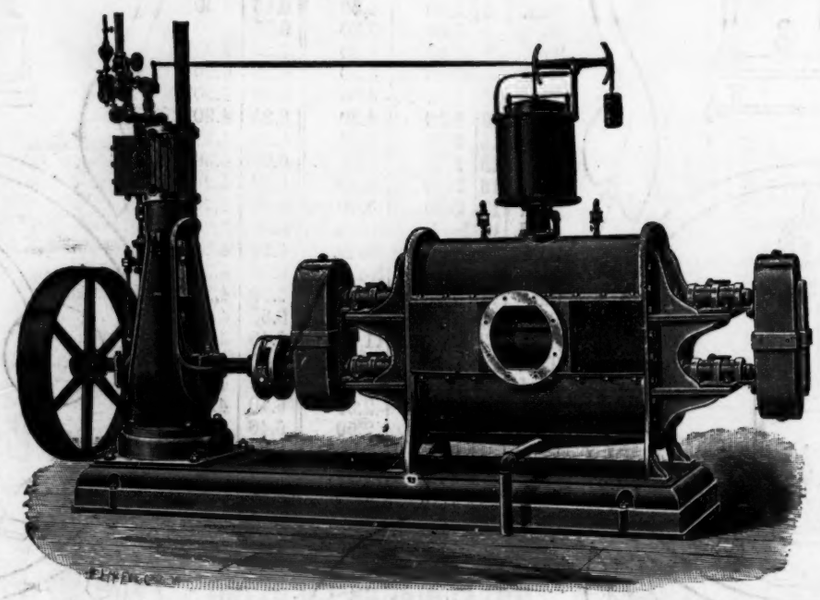

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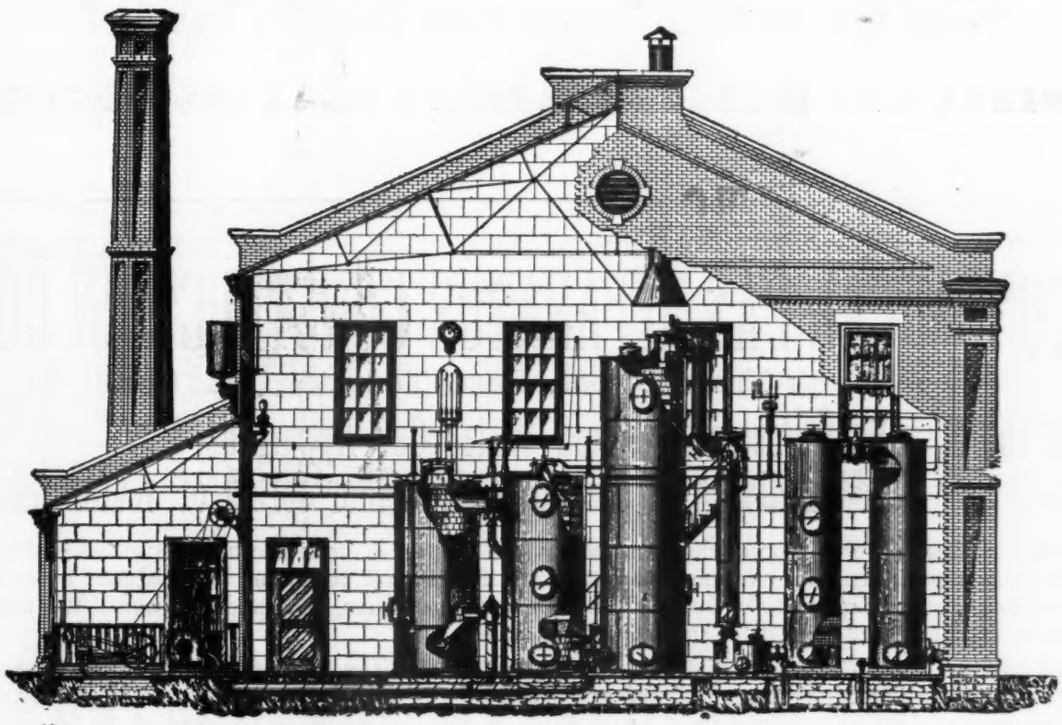

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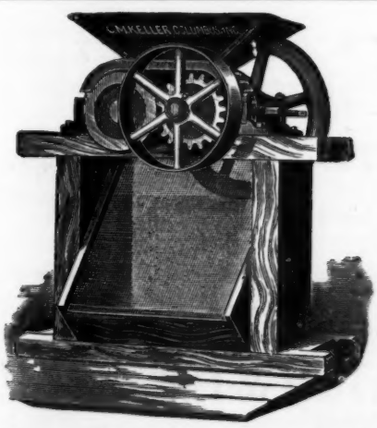

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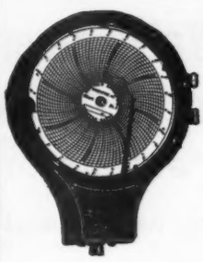

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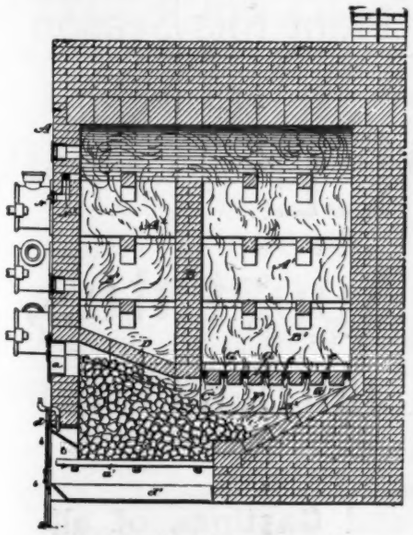

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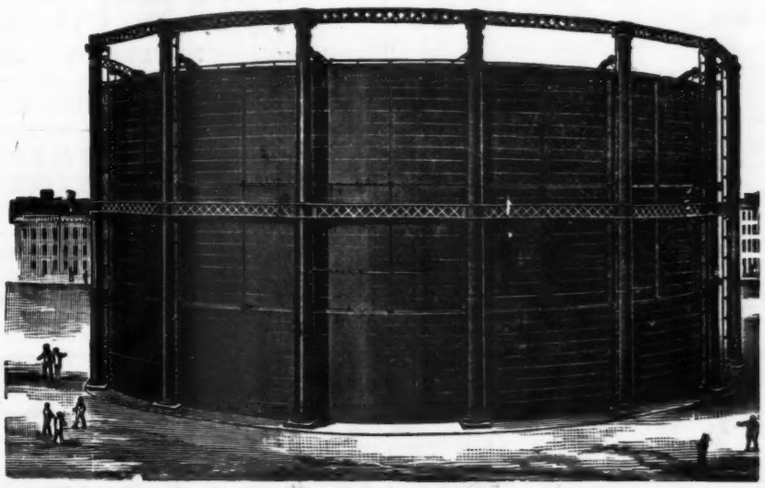

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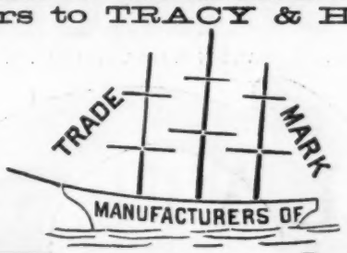

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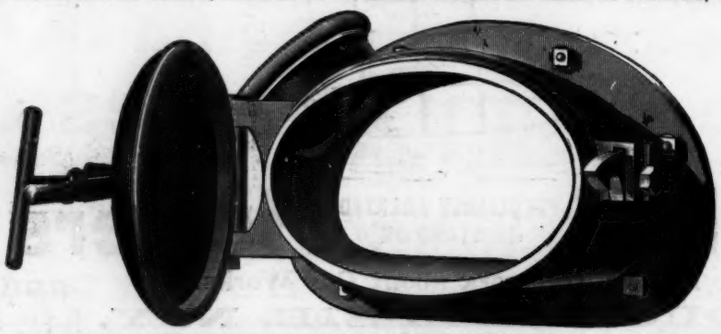

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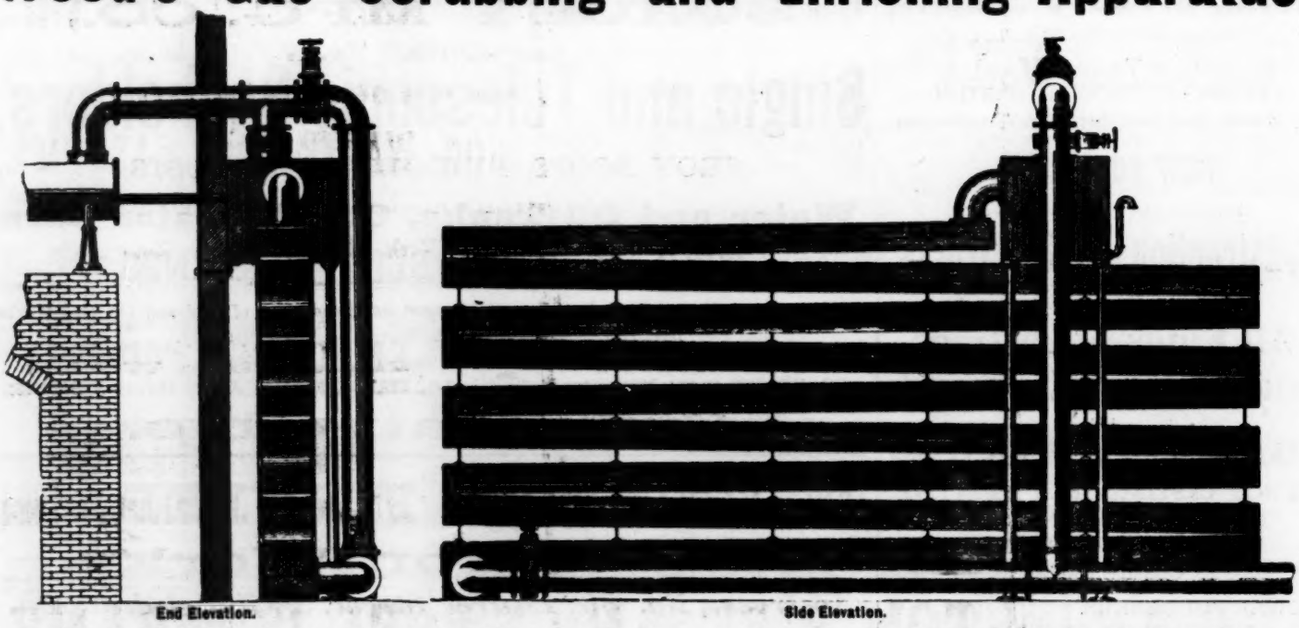

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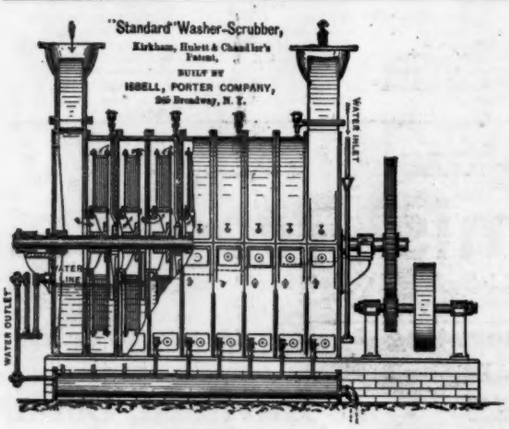

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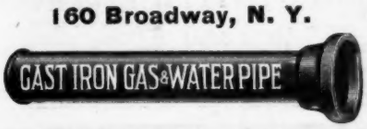

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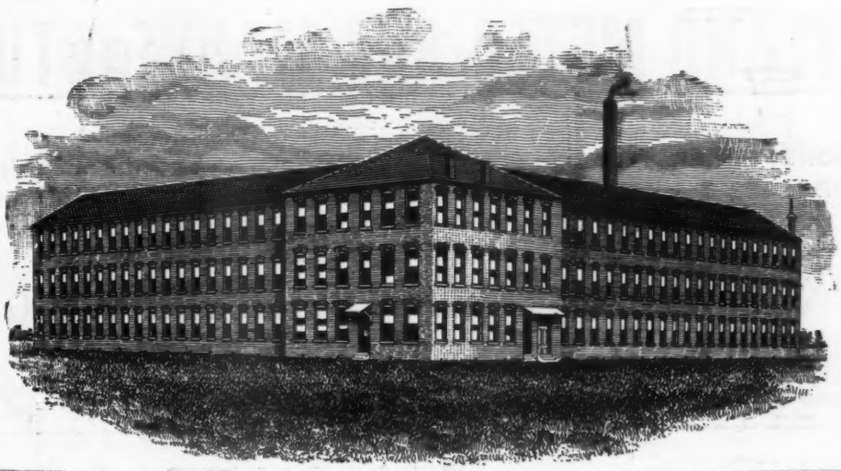

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